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Female Sex Hormone Replacement in the Aged Woman

A Preliminary Report

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RESULTS OF EXPERIMENTS ON THE ADMINISTRATION OF ESTROGEN AND PROGESTERONE TO ELDERLY WOMEN HAVE DISCLOSED THAT MENSTRUAL PERIODS CAN BE INDUCED IN WOMEN MANY YEARS AFTER THE MENOPAUSE, AND THE THEORY IS PRESENTED THAT CONSIDERABLE REJUVENATION OF THE REPRODUCTIVE ORGANS CAN BE BROUGHT ABOUT AFTER ATROPHY HAS OCCURRED.

THE female sex hormones have been used for many years in the treatment of the symptoms which occur because of ovarian deficiency. Endocrine replacement therapy of this type has been given for the most part to patients having symptoms during the natural menopause or distress brought about by an artificial menopause. Very little study has been made, however, of the effects of replacement therapy in the aged woman many years past the natural menopause. There is no particular reason for giving sex hormones to aged women, insofar as producing relief from the menopausal syndrome is concerned, for such women have none of the usual symptoms. There are excellent reasons, however, for wishing to know what effect this type of substitution therapy may have on the organs of reproduction and on the organism as a whole. Administration of sex hormones to an aged woman induces a reversal of one of the inevitable changes of aging and affords an opportunity to find out whether or not some of the manifestations of aging are reversible.

The retrogressive changes which occur in the reproductive organs following either castration or the slow deterioration of the ovary at the time of the natural menopause are, without doubt, brought about by a deficiency of the female sex hormones. It seems probable that these retrogressive changes can be prevented, since it is well known that the female sex hormones can bring about changes in the uterus and vagina of the castrated woman virtually identical with those which occur in the normal adult woman. It is also probable that considerable rejuvenation of the reproductive organs can be brought about after atrophy has occurred, since menstrual periods can be induced in women many years after the menopause. Whether or not any beneficial effects in the individual, other than the relief of menopausal symptoms, can be expected from prolonged replacement therapy is uncertain.

The present study was designed to ascertain, insofar as possible, what effects may be expected in elderly women from the use of the female sex hormones, estrogen and progesterone, when given for long periods of time under carefully controlled conditions.

The hazards of prolonged treatment with the sex hormones may be considerable (1, 4,

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6, 7, 12, 16). Prolonged use of estrogens certainly leads to abnormal bleeding and may cause endometrial hyperplasia. Opinions differ, however, regarding a possible relation of endometrial hyperplasia to endometrial cancer. Some writers (2, 13, 15, 17) think that estrogens may be carcinogenic in the woman, whereas others (3, 14) do not believe that there is much likelihood that carcinoma of the endometrium may be induced by estrogens. The entire subject has been most satisfactorily reviewed in a recent comprehensive study by Gusberg (5).

In view of the possible danger of prolonged use of the female sex hormones, the study has been carried out in such a way as to minimize, insofar as possible, the danger of inducing cancer. One group (which will be the subject of a subsequent report) has been given estrogen cyclicly so that each period of stimulation was followed by a short period without treatment during which estrogen withdrawal bleeding occurred. The second group, the subject of this report, has received estrogen continually, but menstruation has been induced periodically by repeated courses of progesterone. In this way it was hoped that any danger from overstimulation of the endometrium would be reduced to a minimum.

Methods

The results reported in this paper were obtained from a small group made up of 13 postmenopausal women. The youngest was 64 years of age and the eldest was 82. The average age at the beginning of the study was 71.7 years. A complete physical examination was made of each patient at the beginning of the study and occasionally thereafter.

Each patient in the group was given 1.0 mg. of estradiol benzoate twice weekly for six weeks (table 1). This was done to find out whether or not this period of treatment with estrogen was sufficiently long to prime the uterus so that bleeding would occur on withdrawal of the estrogen. Actually, 9 of the 13 patients showed withdrawal bleeding from this relatively short period of stimula-

Table 1. Estrogen Withdrawal Bleeding

Patients treated					
Total Number	Identity by Serial no.	Drug	Medication* Amt.	Duration	No. of patients showing withdrawal bleeding
13	# 1 to 13	Estradiol benzoate	2 mg/wk.	6 wks.	9
4	#10 to 13	Estradiol benzoate	3 mg/wk.	6 wks.	0
4	#10 to 13	Estradiol benzoate	4 mg/wk.	6 wks.	0
3	#10 to 12	Estradiol benzoate +Thyroid	2 mg/wk. 60 mg/day	6 wks.	2
1	#12	Estradiol benzoate +Thyroid	8 mg/wk. 60 mg/day	6 wks.	0
1	#13	Estradiol benzoate +Thiouracil	2 mg/wk. 0.2 gm/day	6 wks.	1

* Thyroid Therapy started at 15 mg/day and gradually increased to 60 mg/day over a period of two months.
All estrogen medication given intramuscularly.

tion. The remaining 4 patients seemed to be refractory since they also failed to bleed when given one course of 3.0 mg. and one of 4.0 mg. of estradiol benzoate per week for six weeks.

These 4 refractory patients were subjected to further study to determine, if possible, why bleeding had not occurred. In view of Jailer, Sperry, Engle, and Smelser's work (9) in the monkey showing that estrogens do not have the normal effect on the uterus of monkeys with experimentally induced hypothyroidism, the basal metabolic rates of these patients were carefully obtained. Three of them had low basal metabolic rates (−14 to −25) and one had a high rate (+15 to +18). The 3 patients with low basal readings were placed on thyroid for several weeks following the slowly increasing dosage dictum of Kountz (10) and then given 1.0 mg. of estradiol benzoate twice weekly for six weeks.Two of them showed withdrawal bleeding. The third patient has not shown withdrawal bleeding despite dosages as high as 8.0 mg. per week. The patient with the elevated basal metabolic rate was given thiouracil, 0.2 gm. daily, for three months. During this time, the basal decreased (+5 to +8). Estradiol benzoate, 1.0 mg. twice weekly for six weeks, was then instituted. This time withdrawal bleeding occurred. The thiouracil was then discontinued. Three months later, dosages of 2.0 mg. and 4.0 mg. estradiol benzoate weekly for six weeks failed to induce withdrawal bleeding.

The estrogen effect on the aging endometrium is definite (fig. 1). An endometrial biopsy was obtained after five and one-half weeks of therapy on 2.0 mg. per week of estradiol benzoate. The stromal cells are well stimulated and the glands are in an early proliferative phase. An occasional gland is cystic and resembles those seen in early hyperplasia of the endometrium. Following this biopsy the patient had one more injection of 1.0 mg. of estradiol benzoate. Eight days after the last of the estrogen therapy withdrawal bleeding occurred. There was no spotting prior to the estimated time of withdrawal, nor was there any subsequent spotting in an accompanying six week period.

The 9 patients who demonstrated immediate withdrawal bleeding at the level of 2.0 mg. per week of estradiol benzoate for six weeks were placed on this dosage and have been maintained on this medication for a period of one and one-half years without any variation in the amount or regularity of the replacement therapy. Vaginal smears taken at regular intervals of three months have shown from 60 to 85 per cent stimulation of the epithelial cells when stained by the iodine vapor technique of Mack (11). In addition to the continuous treatment with estrogen, each patient has received courses of progesterone of various amounts and duration, so spaced as to induce progesterone-withdrawal bleeding at fairly regular intervals.

The first study of the effect of progesterone was carried out by using dosages of 10 mg. daily for periods of time varying from one to twenty-one days (table 2). Progesterone-withdrawal bleeding occurred in all instances regardless of the duration of treatment, and in no case did bleeding occur during the period of administration. Bleeding began usually from three to five days after the last injection of progesterone. The amount of bleeding closely approximated that which they had experienced in their active menstrual life. Two patients that had noticed a prodrome to the onset of menstruation, such as increased nervousness, irritability, and crying spells, had similar symptoms preceding the induced periods.

The results of this study using 10 mg. of progesterone per day are given in table 2. The observations were not made, however, in the sequence implied in the table. In order to be more certain of adequate shedding of the endometrium and to decrease the probability of inducing hyperplasia, the treatment was so arranged that periods of bleeding induced by one, two, or three days of progesterone injection were followed by periods induced by seven, fourteen, or twenty-one days.

The most surprising finding from this study was the result obtained from a single injection

TABLE 2. PROGESTERONE WITHDRAWAL BLEEDING

Patients treated	Drug	Medication* Amt.	Duration	No. of patients showing withdrawal bleeding
9	Progesterone	10 mg.	21 days	9
9	Progesterone	10 mg.	14 days	9
9	Progesterone	10 mg.	7 days	9
9	Progesterone	10 mg.	6 days	9
18	Progesterone	10 mg.	5 days	18
9	Progesterone	10 mg.	4 days	9
9	Progesterone	10 mg.	3 days	9
9	Progesterone	10 mg.	2 days	9
9	Progesterone	10 mg.	1 day	9

* All patients were receiving estradiol benzoate 2 mg. per week as basic medication. All medication was given intramuscularly.

of 10 mg. of progesterone. All patients exhibited withdrawal bleeding. This is in accord with Hisaw's (8) observations on monkeys that a single injection of 1.0 mg. of progesterone is sufficient to induce bleeding in the estrogen-stimulated monkey. Likewise, it was interesting to find out that 10 mg. could be given daily for twenty-one days without any bleeding taking place during the course of treatment.

The study was then extended to determine the effects of smaller dosages of progesterone (table 3). Again, as in the study with 10 mg. daily dosage of progesterone, all patients were maintained on 2.0 mg. of estradiol benzoate per week. Dosages of 5.0 mg. of progesterone were given for periods of twenty-one days, six days, three days, and one day. These results with this dosage differed in some respects from the results with 10 mg. In the first place, all tests of 5.0 mg. daily for six days and three days were followed by withdrawal bleeding. With a single dose of 5.0 mg., however, bleeding occurred in only 12 of 17 tests. This may be considered, therefore, as an inadequate amount since with twice this amount all tests resulted in withdrawal bleeding. The response of the patients to 5.0 mg. per day for twenty-one days also was different from the response to 10 mg. daily. Of the 8 patients who received 5.0 mg. per day for twenty-one days, there were 4 who began to bleed before the end of the injections. This break-through bleeding began in 2 patients of the group on the tenth day, in one on the sixteenth day, and in the fourth

TABLE 3. PROGESTERONE WITHDRAWAL BLEEDING

Patients treated	Drug	Medication* Amt.	Duration	No. of patients showing withdrawal bleeding
8	Progesterone	5 mg.	21 days	8†
9	Progesterone	5 mg.	6 days	9
9	Progesterone	5 mg.	3 days	9
17	Progesterone	5 mg.	1 day	12
9	Progesterone	2 mg.	7 days	9
9	Progesterone	1 mg.	7 days	4

* All patients were receiving estradiol benzoate 2 mg. per week as basic medication.
† Four patients demonstrated break-through bleeding—2 on the 10th day; one on the 16th day; one on the 17th day of therapy.
All medication was given intramuscularly.

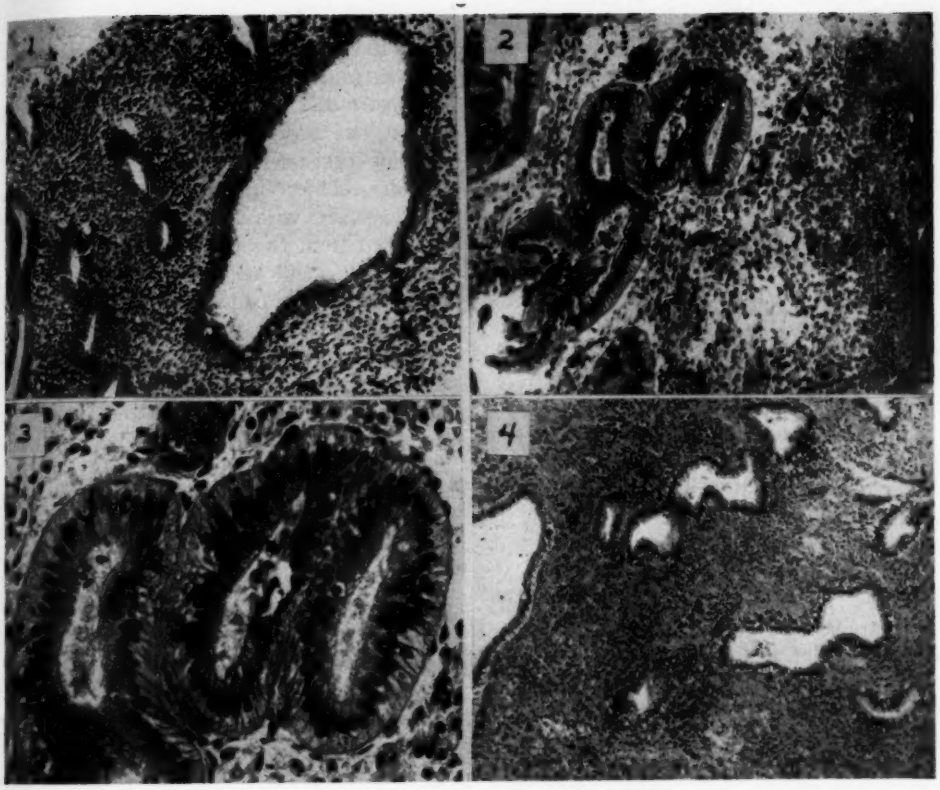

FIG. 1. (125 X). Estrogen stimulation of stroma and early proliferative phase of the glands. Note cystic gland.

FIG. 2. (175 X) and FIG. 3 (325 X). Early secretory phase of the endometrial glands. Note the stromal edema and the extravasated red blood cells.

FIG. 4. (100 X). The glands show limited secretory changes and restricted spiraling. The stroma contains a large number of red blood cells and advanced edema.

on the seventeenth day of treatment. In these 4 patients, scanty bleeding continued throughout the remainder of the period of injections and for from three to five days more. Then, as in all the patients of the group, there was typical progesterone withdrawal bleeding which approximated in duration the amount that was previously observed in the same patients following the 10 mg. dosage.

A few observations have been obtained with dosages of 2.0 mg. and 1.0 mg. of progesterone. All patients who received 2.0 mg. daily for seven days exhibited withdrawal bleeding, but with a dosage of 1.0 mg. daily for seven days, only 4 of the 9 bled. The investigation of the effects of these small dosages is continuing; at present not enough information is available to warrant any further discussion.

The effects of the various dosages of progesterone on the endometrium have been studied in occasional specimens of endometrium obtained with a suction curet. One endometrial biopsy was obtained about twenty-four hours after the onset of bleeding in a patient who had received 10 mg. daily for seven days. Bleeding began three days after the last injection. There are numerous red cells in the stroma, most of the glands are of the spiral type, and the epithelial glands are in an early secretory phase. The nuclei are situated in the middle of the cell and there

are clear vacuoles in the basalar part of the cells. The stage is very similar to that seen about one week after ovulation except for the presence of blood in the stroma (figs. 2 and 3). Another biopsy was obtained soon after the onset of bleeding from a patient who had received 5.0 mg. per day for six days. This endometrium shows less spiraling of the glands and considerably less development of secretory changes in the epithelial cells (fig. 4). The endometrium, nevertheless, is quite different from the endometrium stimulated only by estrogen (fig. 1).

Discussion

The reactivation of the reproductive tract of the aged woman by the natural ovarian hormones, estradiol and progesterone, is of special interest. The changes in the body due to aging are generally considered irreversible. The retrogressive changes in the reproductive tract, however, fall in a special category. They are brought about by the wearing out of the ovary and, in the light of these observations, are reversible. The ovary, to be sure, is probably completely worn out in the aged person and not responsive to any stimulus, such as pituitary gonadotrophic hormone. The remainder of the reproductive tract, however, seems to respond to the female sex hormones in much the same manner in the aged woman as it does in the younger woman during the years of normal ovarian activity.

Whether or not this rejuvenation of a part of the reproductive tract is accompanied by any beneficial effect on the body as a whole remains to be seen. Suffice it to say for the present that none of these patients has been harmed by the prolonged use of estradiol and progesterone. Carcinoma of the breast or carcinoma of the uterus has not appeared. No unusual or severe discomfort has been brought about by the resumption of menstrual cycles. In general, the patients have remained healthy and well.

Some of the effects of progesterone on the uterus are surprising. A dosage of 10 mg. per day for six days or more has produced the expected alteration of the endometrium. Biopsies obtained showed a well developed secretory type of endometrium, especially when the period of treatment was twelve days or more in duration. As expected, dosages of 5.0 mg. and 2.0 mg. per day produced less effect than those of 10 mg. per day. The effect of progesterone on the induction of withdrawal bleeding was surprising, however. In every test with 10 mg. per day bleeding occurred from two to four days after interrupting the medication regardless of whether the progesterone had been given for one day or for twenty-one days. Apparently, once the endometrium has been subjected to the influence of progesterone, even though this stimulus may be transitory and fleeting in nature, it is so altered that withdrawal of the stimulus inevitably leads to breakdown and shedding of the endometrium as in a typical menstrual period, regardless of whether the stimulation with progesterone has been continued long enough to produce a complete progestational endometrium or has been of such a short duration that little or no histologic change has been produced.

The exact mechanism whereby withdrawal of progesterone leads to menstruation is not clear. It seems difficult to explain this as a special case of estrogen-withdrawal bleeding. Progesterone does inhibit some of the effects of estrogen; hence, the effective level of estrogen might be considered to be reduced to sufficiently low levels to result in bleeding when progesterone and estrogen are given in proper combination. This explanation might be evoked to explain the bleeding which occurs after the administration of progesterone for several days, but it does not seem a likely explanation for the menstrual periods induced by a single injection of 10 mg. of progesterone. It seems simpler to admit that there are two mechanisms for the induction of uterine bleeding; one brought about exclusively by estrogen-deprivation in the absence of progesterone and the other brought about by progesterone-deprivation in the presence of estrogen.

The dosage of 5.0 mg. of progesterone per day for twenty-one days likewise produced some very interesting results. Four of the

8 patients began bleeding while still receiving the injections. This break-through bleeding did not occur in the same patients when they received 10 mg. per day. This abnormal bleeding can, therefore, be directly ascribable to a deficiency of progesterone. The clinical picture is in the process of a more exhaustive investigation and will be reported in detail in the near future.

The induction of menstruation with small amount of progesterone for short periods of time cannot be considered as evidence in favor of using such small amounts (1.0 mg. daily) in women with disturbances of the menstrual cycle. The effects of progesterone in this group of aged women were induced under conditions in which the uterus was subjected to a known and constant amount of stimulation of estrogen (2.0 mg. estradiol benzoate per week). Either an increase or a decrease of the amount of estrogen stimulation would probably require a change in the amount of progesterone necessary to produce the usual effect on the endometrium and the induction of progesterone-withdrawal bleeding. In women with menstrual disturbances the amount of estrogen being produced by the ovary is unknown. Consequently the amount of progesterone which may be required to produce the desired effect will still have to be determined by actual trial. These observations in aged women can only be used as a helpful guide.

Finally, studies of the sort reported in this paper provide a method for comparing the activity of various preparations having progestational activity. Either a short period of injections or a single injection could be used. The results reported here show that bleeding was obtained in 12 out of 17 attempts when a single injection of 5.0 mg. of progesterone was given and in 9 of 9 attempts when a single injection of 10 mg. was given. This is not far from a theoretical human daily unit, if the human unit be defined as the amount of material necessary to produce bleeding in one-half of the trials under constant conditions. A similar bioassay could be carried out using a period of seven days for the injections. When 2.0 mg. per day were given, bleeding occurred in 9 of 9 attempts, whereas, when 1.0 mg. per day was given, bleeding occurred in 4 of 9 attempts.

Summary

A preliminary report has been presented of investigations being carried out concerning the possibilities of genital regeneration in women well past the menopausal age. Estrogen withdrawal bleeding in 12 post-menopausal patients has been demonstrated, and the successful clinical use of thyroid and thiouracil in particular patients to aid in producing estrogen withdrawal bleeding has been described.

Shedding of the endometrium with 10 mg. of progesterone per day, together with a variation of the duration of therapy, has been presented. The results obtained in 9 different experiments have been charted and discussed.

Early investigation with the use of clinically inadequate levels of progesterone has been pointed out, and an interesting entity termed break-through bleeding has been mentioned. Representative endometrial biopsies have been presented and briefly discussed.

As a conclusion to this preliminary report, it may be stated that in many patients well past the menopause the uterus has been stimulated to demonstrate both estrogen and progesterone withdrawal bleeding under the influence of an adequate amount of replacement therapy.

The facilities for studying the patients included in this investigation were made available by the kind cooperation of Dr. William B. Kountz, Chief of Clinical Service, Division of Gerontology, Washington University School of Medicine.

The Schering Corporation generously provided the estrogen and progesterone necessary to carry out this program.

References

1. Ayre, J. E., and Bauld, W. A. G.: Thiamine Deficiency and High Estrogen Findings in Uterine Cancer and in Menorrhagia. *Science, 103:* 441–445, 1946.
2. Crossen, R. J., and Hobbs, J. E.: Relationship of Late Menstruation to Carcinoma of the Corpus Uteri. *J. Missouri M. A., 32:* 361–363, 1935.

3. Fluhman, C. F., and Stephenson, H. A.: The Coincidence of Hyperplasia Endometrii and Carcinoma Corporis Uteri. *Surg., Gynec. & Obst., 48:* 425–428, 1929.
4. Gemell, A. A., and Jeffcoate, T. N. A.: Estrogens and Carcinoma of the Uterus. *J. Obst. & Gynaec. Brit. Emp., 46:* 985–993, 1939.
5. Gusberg, S. B.: Precursors of Corpus Carcinoma Estrogens and Adenomatous Hyperplasia. *Am. J. Obst. & Gynec., 54:* 905–927, 1947.
6. Henry, J. S.: Avoidance of Untoward Effects of Oestrogenic Therapy in the Menopause. *Canad. M. A. J., 53:* 31–37, 1945.
7. Herrell, W. E.: Studies on the Endometrium in Association with the Normal Menstrual Cycle, with Ovarian Dysfunctions and Cancer of the Uterus. *Am. J. Obst. & Gynec., 37:* 559–572, 1939.
8. Hisaw, F. L.: The Interaction of Ovarian Hormones in Experimental Menstruation. *Endocrinology, 30:* 301–308, 1942.
9. Jailer, J. W., Sperry, W. M., Engle, E. T., and Smelser, G.: Experimental Hypothyroidism in the Monkey. *Endocrinology, 35:* 27–37, 1944.
10. Kountz, William: Personal communication, 1946.
11. Mack, H. C.: A New and Rapid Method of Staining Vaginal Smears Based upon a Specific Color Reaction for Glycogen. *Harper Hosp. Bull., 1:* 54–56, 1942.
12. Meigs, J. V.: Gynecology: Carcinoma of the Endometrium. *New England J. Med., 233:* 11–17, 1945.
13. Novak, E., and Yui, E.: Relation of Endometrial Hyperplasia to Adenocarcinoma of the Uterus. *Am. J. Obst. & Gynec., 32:* 674–698, 1936.
14. Payne, F. L.: Clinical Significance of Endometrial Hyperplasia. *Am. J. Obst. & Gynec., 34:* 762–779, 1937.
15. Randall, C. L.: Recognition and Management of the Woman Predisposed to Uterine Adenocarcinoma. *J. A. M. A., 127:* 20–25, 1945.
16. Smith, G. van S.: Carcinoma of the Endometrium. *New England J. Med., 225:* 608–615, 1941.
17. Taylor, H. C., Jr.: Endometrial Hyperplasia and Carcinoma of the Body of the Uterus. *Am. J. Obst. & Gynec., 23:* 309–332, 1932.

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Excitability and Aging

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THE DATA PRESENTED BY DR. BOURLIÈRE SHOW A REMARKABLE CONSTANCY OF NEUROMUSCULAR AND VESTIBULAR EXCITABILITY FROM MATURITY TO OLD AGE, BOTH IN MAN AND IN THE RAT, PROVIDED THAT NO PATHOLOGIC CONDITION OF THE NERVOUS SYSTEM WERE PRESENT. NO DIFFERENCES IN CHRONAXIES WERE NOTED BETWEEN MEN AND WOMEN OR MALE AND FEMALE RATS, ALTHOUGH A MARKED DIFFERENCE IN THE LATTER WAS NOTED BETWEEN LITTERS OF DIFFERENT SIZE.

THE property of reacting to changes in environment is a fundamental characteristic of all living protoplasm. Thus, mechanical, thermal, chemical, and electrical changes may act as stimuli to living cells, tissues, and organisms. Of all these different stimuli capable of exciting the organs of higher vertebrates, the electrical is the most widely used for experimental purposes. It is easy to graduate its intensity and duration accurately, and such a stimulus may be applied many times without injury. Of all tissues whose excitability has been extensively studied, muscle and nerve, either in situ or freshly removed from the body, are the most important from the standpoint of human physiology.

Time Factor in Excitability

The first investigations found that the excitabilities of different living tissues varied widely. The work of Lapicque (11) established that the effect produced by a stimulus depends not only on the intensity of the stimulus but also on the length of time for which it is allowed to act. It has been proved that a current that will just excite a tissue when of a particular duration fails to do so when its duration is reduced below a certain level; for a given current, further continuation of the current, beyond a duration specific for each tissue, produces no further effect. Lapicque determined a particular time factor which he called the chronaxie. This may be defined as the shortest duration required for an electrical stimulus of twice the threshold strength to be effective. In order to determine the chronaxie of a living tissue one must first find out the galvanic threshold or rheobase, then double the voltage so employed, and finally, using condenser discharges, find the shortest duration at which a stimulus of this strength will excite.

Provided that the experimental conditions are constant, the chronaxie of a tissue is a definite measure of its excitability. If stimulating electrodes of similar size and nature are used, it is possible to obtain constant conditions from one experiment to another and in this way to avoid the sources of error pointed out by Rushton. A good summary of the main results obtained by the chronaxic method will be found in such books as those by Lapicque (11), Monnier (13), or in the very useful *Outline of General Physiology* by Heilbrunn (10).

Methods

Methods for the chronaxie determination in man and living mammals have been perfected by Bourguignon. His numerous publications contain a wealth of information on the various techniques as well as on their applications to the study of various physiologic and pathologic problems.

In the present study, the technique for the determination of neuro-muscular chronaxie employed by Bourguignon (4) was used. In the rat, the adductor muscle of the thigh was selected, the liminal stimulus being especially easy to estimate after the skin has been carefully shaved. The anode was placed upon the

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abdomen of the animal, the small cathode or active electrode being brought into contact with the motor point, which had been carefully located at the beginning of the experiment. In man the usual method was employed.

In determining the vestibular chronaxie, the mono-auricular technique (Bourguignon, 5) was used in experiments carried out on men, and the bi-auricular method (Bourguignon and Bennati, 7; Bourguignon, 6) for rats.

The rats used in this study were albino rats from the stock colony of the Department of Physiology, School of Medicine, Paris University. They were fed on a Maynard diet supplemented with green vegetables. The animals were housed in a room whose temperature was maintained between 20 and 25°C, and were protected from extremes of temperature.

Aging and Neuro-muscular Excitability

Between birth and old age the values of neuro-muscular chronaxie undergo important changes both in the rat and in man. The data published in 1921 by Banu, Bourguignon, and Laugier (1) showed that, at birth, every muscle and nerve had a greater chronaxie than during maturity, but no data for old age were published by these authors. The present paper is intended to fill this gap. My observations were made on women (table 1) aged 20 to 84, supplemented by experiment on rats at the ages of 1 to 810 days (table 2).

In man, chronaxies of muscles and nerves are much longer in the new-born than in the adult, and the muscles whose chronaxies are normally small during adult age are those which have higher chronaxies at birth and vice versa. For instance, the chronaxies of the flexor muscles of the arm and of the internal head of triceps brachii, which vary between 0.06 and 0.14 msec. in the adult, are ten times longer in the new-born; the chronaxies of the posterior brachial muscles, which normally vary between 0.16 and 0.34 msec., are five times longer at birth; the chronaxies of the anterior antebrachial muscles, which normally vary from 0.15 to 0.34 msec., are twice as long at birth; but the chronaxies of the posterior antebrachial muscles, which vary between 0.40 and 0.70 msec. during maturity, are never greater at birth than the highest values in the adult.

Values characteristic of maturity are gradually reached between the seventh and sixteenth month, which corresponds to the age when a child tries to stand up and begins to walk. As soon as the child walks, the values specific for each group of muscles are attained. For nerves, the adult chronaxie is reached sooner than for muscles, usually between the second and third month.

After the eighteenth month no change is noted for the rest of the span of life. Table 1 summarizes the results from the examination of 203 subjects. As no differences were noted between men and women, only chronaxies of 160 healthy women are included in this table. Provided that no pathologic troubles were present, a perfect constancy of neuro-muscular excitability was recorded in both sexes.

In the rat similar results were obtained (table 2). During the first days of the post-embryonic life a sharp decline in the values of neuro-muscular chronaxie was observed, followed by a more gradual decrease after the first week. A marked difference may be noted between litters of different size. In litters of 7 to 10 young or more the adult values are reached at about 20 days, while in less numerous litters (5 young) these values are attained at about 15 days. This evolution of the neuro-muscular chronaxie seems to depend closely on the rate of growth. Similar results have been obtained with a similar method, but with

TABLE 1. EXCITABILITY IN WOMEN

	Age in years						
	20–29	30–39	40–49	50–59	60–69	70–79	80–84
Neuro-muscular chronaxie (milliseconds)							
Biceps	0.07	0.07	0.07	0.06	0.07	0.07	0.07
σ	0.01	0.02	0.01	0.02	0.02	0.01	0.01
Flexors digit	0.19	0.19	0.20	0.21	0.20	0.20	0.19
σ	0.02	0.03	0.07	0.03	0.04	0.03	0.03
Vestibular chronaxie							
Head inclination towards positive pole	16.8	17.7	16.7	16.9	17.8	18.4	18.3
σ	1.3	1.4	1.4	1.3	1.9	2.0	2.7
Head inclination towards negative pole	18.8	19.9	19.2	19.2	21.2	20.4	21.6
σ	1.3	1.8	1.5	1.6	2.6	2.3	3.1
No. of subjects	33	25	13	21	40	22	6

a different muscle, the triceps surae, by Beauvallet, Bonvallet, and Couteaux (2).

After the third week the neuro-muscular chronaxie of the adductor of the thigh remains at a constant level up to the end of the life span. It is impossible to find any significant difference between the chronaxies of rats 1 month old and 28 months old.

AGING AND VESTIBULAR EXCITABILITY

The determination of vestibular chronaxie (Bourguignon and Dejean, 8; Bourguignon, 5) is based upon the phenomenon of galvanic vertigo. However, instead of looking for the threshold of the reflex of lateral head inclination with a constant current, rheobase and chronaxie are measured by means of condenser discharges.

In the mono-auricular method the head moves sideways in the direction whence the excitation originates when the positive pole is placed in the external auditory meatus, and in the opposite direction when it is placed on the mastoid.

In the bi-auricular method the head moves sideways towards the side where the positive pole is placed.

Up to now it has been impossible to determine accurately the vestibular chronaxie in very young children, their movements making it very difficult to note the sideways inclination of the head. But between the ages of 2 and 84 years the values remained remarkably constant in all the healthy men and women examined. Results for women are collected in table 1. In subjects over 50 years one should take great care to avoid carrying out experiments on deaf subjects or on patients suffering from vertigo or memory troubles. In these conditions, the vestibular chronaxies are more or less lengthened.

For the rat, data on the evolution of vestibular excitability from the first day of post-embryonic life up to the twenty-eighth month

TABLE 2. EXCITABILITY IN RATS

	Age in days										
	1	4	8	10	15	25	80	330	420	730	810
Neuro-muscular chronaxie (milliseconds)											
Adductor of the thigh	17.6	6.6	2.16	0.57	0.21	0.07	0.07	0.07	0.06	0.07	0.07
σ	3.4	2.7	1.3	0.06	0.07	0.01	0.01	0.01	0.02	0.02	0.01
Vestibular chronaxie											
Right side head inclination	162	114	102	73.2	30.4	29.9	29.8	29.2	30.4	30.5	30.8
σ	14.2	9.2	12.3	13.9	2.8	0.9	0.3	0.7	0.4	0.9	0.6
Left side head inclination	198	132	84	72.5	29.1	25.4	25.6	26.0	25.6	26.5	26.5
σ	17.6	13.4	10.7	13.9	3.5	0.9	0.8	0.9	0.8	0.9	0.3
No. of determinations	10	10	10	21	14	10	10	10	10	18	9

are summarized in table 2. Fifty animals were examined, several times in most cases. Most of these animals were females, but no sexual differences were noted.

At birth the values of vestibular chronaxie are very high—162 msec. for inclination on the right side and 198 msec. for the left side. These values decrease sharply and settle at maturity level between the tenth and fifteenth day. Surprisingly, in the first few days following birth, the head moves sideways in the direction of the negative pole and the chronaxie for inclination to the left is longer than for inclination to the right. This phenomenon, to which no exception was found in the 7 litters examined, does not last long, and ends between the eighth and the fifteenth day. As noted for neuro-muscular chronaxie, litter size clearly influences the length of time necessary to reach maturity values. The data contained in table 2 give average values for litters of 7 to 10 young. For smaller litters adult values are reached earlier, on about the tenth day.

From the fifteenth day up to the twenty-eighth month the vestibular excitability remains exactly the same, the chronaxies for head inclination to the right being from 4 to 5 msec. longer than for inclination to the left. Pulmonary or intestinal diseases do not affect the normal values during the last months of life.

Discussion

These data show a remarkable constancy of neuro-muscular and vestibular excitability from maturity to old age. Nevertheless that does not imply that significant differences do not exist in other nervous mechanisms during senility. For instance, numerous experiments performed both on man and on the rat prove that old age is concomitant with a strong impairment of the functions of the cerebral cortex. Determinations of reaction time in young, adult, and old men, and also in rats, showed that the time interval between the application of a stimulus and a voluntary response is lengthened after 50 years in man and after 500 days in the rat. For this animal Brody (9) found that the reaction time declines from birth to about 100 days of age, remains virtually constant between 100 and 500 days, and rises steeply after about 2 years of age. Similar results for man were published by Miles (12) and Bellis (3).

Anatomical data confirm this asynchronism of functional involution in nervous system. Cecile and Oskar Vogt (15) pointed out recently that the time of onset of aging is not the same for different cell types in the nervous system. Thus in man the cells of the inferior olivary body age particularly early, those of the pons much later, and the vital cells of the medulla oblongata very late.

Summary

Neuro-muscular and vestibular excitability has been studied in rats from birth to old age. The maturity values are reached between the tenth and twentieth days. They remain at a constant level up to about 28 months.

In man no change was noted between adult and old subjects provided that no pathologic conditions of the nervous system were present.

This investigation was made at the Department of Physiology of the Paris University School of Medicine and at the Hospital of La Salpetriere. Acknowledgment is made of the untiring technical assistance of Dr. G. Bourguignon.

References

1. Banu, G., Bourguignon, G., and Laugier, H.: La Chronaxie chez le Nouveau Né. *Compt. rend. Soc. de biol., 85:* 49–51, 1921.
2. Beauvallet, M., Bonvallet, M., and Couteaux, R.: L'Excitabilité de la Fibre Nerveuse Avant et Pendant la Période de Myélinisation. *Compt. rend. Soc. de biol., 137:* 660–662, 1943.
3. Bellis, C. J.: Reaction Time and Chronological Age. *Proc. Soc. Exper. Biol. & Med., 30:* 801–803, 1933.
4. Bourguignon, G.: *La Chronaxie chez l'Homme.* Masson, Paris, 1923.
5. Bourguignon, G.: Double Inclinaison et Double Chronaxie Vestibulaire par Excitation Monoauriculaire chez l'Homme. *Compt. rend. Soc. de biol., 116:* 1289–1292, 1934.
6. Bourguignon, G.: L'Indice Chronologique Vestibulaire du Cobaye. *Compt. rend. Soc. de biol., 139:* 597–598, 1945.

7. Bourguignon, G., and Bennati, D.: Chronaxie Vestibulaire Bi-auriculaire et Mono-auriculaire chez le Chat et le Lapin. *Compt. rend. Soc. de biol., 116:* 1292–1294, 1934.
8. Bourguignon, G., and Dejean, R.: Chronaxie Normale du Nerf Vestibulaire chez l'Homme. *Compt. rend. Acad. d. sc., 184:* 1349–1351, 1927.
9. Brody, E. B.: The Influence of Age, Hypophysectomy, Thyroidectomy and Thyroxin Injection on Simple Reaction Time in the Rat. *J. Gen. Physiol., 24:* 433–436, 1941.
10. Heilbrunn, L. V.: *An Outline of General Physiology.* W. B. Saunders Co., Philadelphia, 1943, second edition, revised.
11. Lapicque, L.: *L'Excitabilité en Fonction du Temps.* Presses Universitaires, Paris, 1926.
12. Miles, W. R.: Measures of Certain Abilities Throughout the Life-span. *Proc. Nat. Acad. Sc., 17:* 627–633, 1931.
13. Monnier, A. M.: *L'Excitation Électrique des Tissus.* Hermann, Paris, 1935.
14. Rushton, W. A. H.: The Time Factor in Electrical Excitation. *Biol. Rev., 10:* 1–17, 1935.
15. Vogt, C., and Vogt, O.: Ageing of Nerve Cells. *Nature, 158:* 304, 1946.

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Carotid Sinus Pressure as an Aid in the Detection of Atherosclerosis

JOSEPH I. GOODMAN AND SIGMUND WASSERMANN

OF THE THREE REACTIONS TO THE CAROTID SINUS PRESSURE TEST FOUND BY DR. GOODMAN AND DR. WASSERMANN, ONE WAS A DROP IN BLOOD PRESSURE. THE THEORY IS ADVANCED THAT THIS VASODEPRESSOR EFFECT IS ENCOUNTERED ONLY IN THE PRESENCE OF ATHEROSCLEROSIS.

IN a former report it was pointed out that a positive response to carotid sinus pressure was commonplace among elderly individuals in contrast to younger persons in whom as a rule no reaction is to be expected (15). The relationship of arteriosclerosis, particularly atherosclerosis, to the so-called hyperactive carotid sinus effect was shown. In the light of these conclusions it was decided to try the carotid sinus reaction as a test for arteriosclerosis of the aorta and the common carotid arteries. The importance of ascertaining the existence and severity of arteriosclerosis in old persons is self-evident. We found, however, that an accurate evaluation of arteriosclerosis in such patients was unsatisfactory with the routine measures such as roentgen rays, percussion, auscultation, and palpation. The limitations of these methods will be discussed later. Therefore, we employed the carotid-sinus-pressure test in our subjects at the Cuyahoga County Nursing Home in which the older age groups predominate.

In the course of the examinations it was noted that the patients with significant responses to the carotid-sinus-pressure (C.S.P.) test exhibited three types of cardiac and vasomotor reactions: (1) a marked bradycardic response, (2) a protracted fall in the arterial blood pressure, and (3) a combination of the two (fig. 1).

Group 1.—In this group belong cases with either a marked bradycardia or a cardiac standstill accompanied by a transient fall in the blood pressure (fig. 1, type I). We find that the cardioinhibitory (bradycardic) reaction is of very brief duration and has to be measured in terms of seconds. Of course, whenever the heart rate is diminished there occurs a concomitant fall in the blood pressure to a depth in keeping with the degree of cardiac slowing. Since the drop in the blood pressure in this group stems principally from the associated bradycardia or asystole, it is a transient reaction; consequently the initial blood pressure level is attained practically simultaneously with the return of the heart to its original rate. Should the vasodepressor response noticeably outlast the bradycardic effect in a given case it is classed as a mixed reaction (see group 3).

Group 2.—In this group we observed a marked fall of the systolic blood pressure, from 20 to 100 mm. Hg., *without* a noticeable effect on the heart rate (fig. 1, type II). One is repeatedly impressed by the long duration of the vasodepressor effect observed in these cases as compared with group 1, in which the effect is so evanescent. The drop in the blood pressure is sustained, although it often fluctuates, and persists in some instances from thirty to sixty minutes at which time the observations were discontinued. These findings, which incidentally are in full accord with Hering's experiments (5), emphasize the independence of the two components of the sino-aortic reflexes, the cardiac and vasomotor.

It appears, however, upon reviewing the literature pertaining to the carotid sinus reaction in man, that the vasodepressor re-

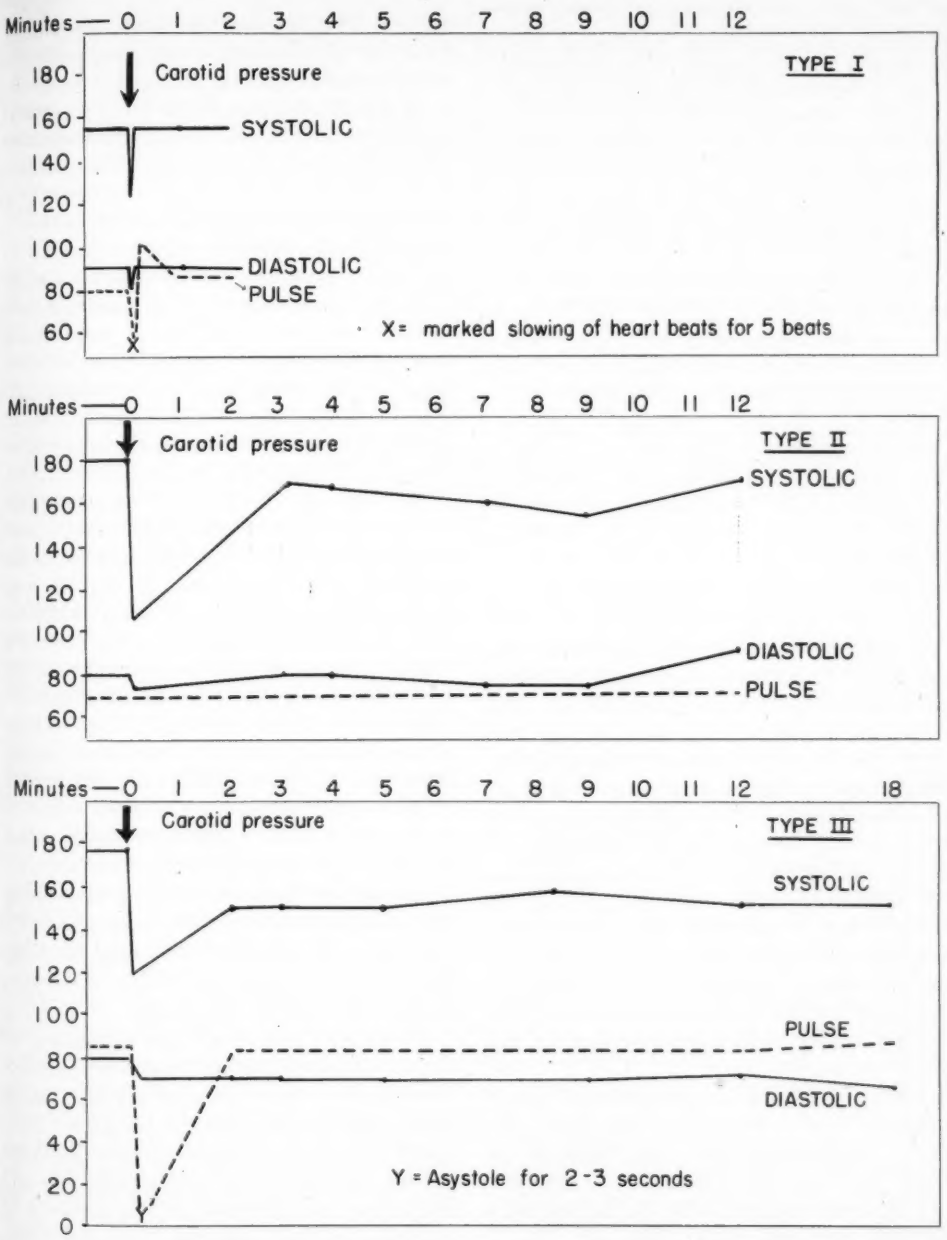

FIG. 1. Response to carotid sinus pressure.

Type I. Cardioinhibitory response: marked bradycardia or asystole with transient drop in blood pressure.

Type II. Vasodepressor response: sustained drop in blood pressure and no effect on the heart rate.

Type III. Mixed response: marked bradycardia or asystole with sustained drop in blood pressure.

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sponse has been neglected in clinical medicine probably because the conspicuous inhibitory effect overshadows the vasomotor effect. This oversight is further explained by the fact that the blood pressure determinations must be continued beyond the period in which the bradycardic effect predominates. In many of our cases the carotid-sinus-pressure test would have been interpreted as negative were the bradycardic response the sole criterion. Yet in carrying out carotid-sinus-pressure tests routinely with blood pressure determinations, sustained vasodepressor responses were detected in many patients. The subject matter of this paper rests upon this observation.

Group 3.—Upon the application of carotid sinus pressure a number of cases presented both a marked immediate retardation in the pulse rate and a drop in the blood pressure, the latter of long duration and the former a fleeting effect (fig. 1, type III).

We have adopted an arbitrary time limit of three minutes as a dividing line between the transient drop in the blood pressure resulting from a diminished heart rate and the independent vasodepressor reaction. A fall in the systolic pressure lasting three minutes or longer is classified as a pure vasomotor response (group 2).

Of the three types of reactions to carotid sinus pressure the persistent vasodepressor effect attracted our attention. The question arises: How can the long duration of the blood pressure drop be explained? Certainly not by the bradycardic reaction in view of its transitory nature. The occurrence of an independent vasodepressor response in man then calls for an explanation. As suggested in a previous report (15) the principal underlying cause of defection of the sino-aortic reflex mechanism appears to be proximal or central atherosclerosis, that is, sclerosis of the aortic arch and the large adjacent arteries.

It is well known that the receptor endings of the afferent nerves are situated in the arch of the aorta and at the bifurcations of the common carotid arteries. Since the sino-aortic reflexes maintain to a great extent the systemic blood pressure level, a defect in the function of this system may alter the control of the blood pressure. It is reasonable to assume that a sclerotic barrier such as would be interposed in arteriosclerosis between the endovascular pressure stimulus and the pressoreceptor nerve endings in the adventitia of these vessels could hamper the buffer action of the four sino-aortic nerves. Therefore, external digital stimulation of one of the carotid sinuses is prone to produce an excessive fall in the arterial blood pressure because the other three pressoreceptors are unable to counterbalance the stimulus effectively.

Technique.—Although the technique of the carotid-sinus-pressure test is well known, several points which proved helpful to us in performing the test deserve mention. Inasmuch as it is quite difficult for one physician to take the blood pressure and pulse rate and also apply carotid pressure, the presence of two examiners is preferable. One can follow the blood pressure variations, the second meanwhile applying carotid pressure and observing the pulse rate or heart rate. Should the services of two physicians not be available the following modification has been

found advantageous: The diaphragm of the stethoscope is fastened under the sphygmanometer cuff over the brachial artery by inflating the cuff. With this procedure a single examiner can auscult the arterial sounds and take the blood pressure while stimulating the carotid sinus.

It should be stressed that the trigger point of the carotid sinus can be missed so that it should not be concluded that the C.S.P. test is negative until several trials have been made.

Proximal atherosclerosis.—It is well known that the aorta and its large branches are elastic arteries and that the prevailing type of arteriosclerosis in such arteries is atheromatosis, or intimal sclerosis. Unfortunately, there are only a few methods available for the diagnosis of proximal atherosclerosis. Of these probably the most commonly employed procedure is the visualization of the aorta and an estimation of its opacity by roentgen rays. "Of course uncalcified arteries do not show by roentgenogram and consequently a considerable number of atheromatous cases are overlooked" (6). Accentuation of the second aortic sound is undoubtedly of assistance. Still, it may be difficult at times to differentiate atherosclerosis from hypertension by the character of the aortic second sound.

In consequence of the frequent use of the C.S.P. test it was surprising to find how often the common carotid artery and the carotid bulb exhibit marked rigidity and tortuosity. Under the influence of Fischer and Schlayer's (4) and Keele's (7) pathologic findings which indicate that atheromatosis has a predilection for the common carotid, innominate, and subclavian arteries in addition to the aorta, it became routine to search for pulsations in the suprasternal notch and supraclavicular fossae. Pulsating neck vessels occur frequently in patients having a positive C.S.P. test. Inasmuch as the blood pressure in the majority of these patients was not significantly elevated, we deduced that the aorta and the great vessels are sclerotic, dilated, and slightly displaced in these individuals.

A further result of focusing attention on the neck region was the extensive use of auscultation in the supraclavicular fossae, the suprasternal notch, and along the course of the common carotid arteries. Not infrequently when the aortic sounds are indistinct or even inaudible, sharply defined second sounds are present in the supraclavicular fossae or in the suprasternal notch. Without entering into further detail concerning the origin of these sounds, we offer this finding as an auxiliary physical sign of proximal atherosclerosis, providing hypertension and the occasional case of hyperthyroidism, neurocirculatory asthenia, and the like can be excluded.

It is evident that any discussion of arteriosclerosis of the aorta and the great vessels must include mention of the coronary arteries, not only because of their proximity, but principally because the latter, though classed as muscular arteries are, nevertheless, predisposed to atheromatosis. In a former paper (15) it was postulated that the cardioinhibitory effect in a positive C.S.P. test hinges upon the existence of ischemia of the conduction system secondary to coronary artery sclerosis. We reached the conclusion that when atherosclerosis is present in both the aorta and the coronary arteries, the lasting vasodepressor response to the C.S.P. test is indicative of proximal sclerosis and the bradycardic response of coronary sclerosis.

Peripheral (distal) arteriosclerosis.—Generally speaking rigid, tortuous brachial and radial arteries are considered a *sine qua non* of arteriosclerosis. In fact it has become widespread practice to make a diagnosis of generalized arteriosclerosis by palpation of vessels. We cannot subscribe to this view. In many cases it was found that the arteries which give the impression of marked rigidity are actually soft and compressible as shown by the following method of palpation. In examining the right brachial artery, for instance, the upper or proximal segment is compressed by one or more fingers of the left hand; the lower or distal segment is similarly compressed by the right hand in order to exclude the normal flow and the collateral circulation. In this manner both index fingers are free to examine the wall of the intervening segment. In the examination of the left bra-

chial artery the order of the hands is reversed. We prefer the method presented here to the one required by British life insurance companies (10) which entails palpation of the radial artery using the fingers of one hand. With our method the *normal* arterial wall cannot be felt at all. However, many times we have encountered a tortuous, bulging, thickened artery only to discover with the maneuver described that there is no palpatory evidence of a vessel wall. Yet arteries such as this are usually accepted as sclerotic.

In other cases rolling the brachial or radial artery under the fingers gives a rubbery sensation which can best be likened to the consistency of the tubing of a stethoscope. The best illustration of this type of artery is found in essential hypertension. Here, despite greatly increased resistance and even marked tortuosity of the artery, compression of the upper and lower segments causes either complete disappearance or the vessel gives a tape-like impression. According to Pal (12) in hypertension there exists increased tone of the arterial muscle. Recently this view has been supported by Bell (2) who states that "hardness depends more on the tonicity of muscle than on intimal thickening."

Of course the detection of actual medial calcification does not require any special skill, although care must be employed in obese persons and in those showing recent weight loss not to confuse the beady sensation of the subcutaneous fat lobulations with calcification of the arteries. In its most advanced form medial or Mönckeberg's sclerosis presents itself as calcified rings (gooseneck arteries) which are readily palpable. It is unfortunate that such striking findings cannot be used in assessing the state of the intima. Though the occlusive lesions of arteriosclerosis usually stem from underlying intimal lesions it is obvious that the intima of an artery is not subject to palpation (Fischer and Schlayer, 4, in opposition to Thayer and Fabyan, 14). These facts notwithstanding, the tendency prevails to judge the state of the intima on the basis of the palpatory findings of peripheral arteries.

Bilateral femoral artery occlusion.—In the course of study of the C.S.P. test we encountered 3 cases with complete absence of pulsations in *both* femoral arteries.

Case 1.—B.T., a 60-year-old white laborer with pulmonary tuberculosis was referred to the Nursing Home from Cleveland City Hospital on January 21, 1947, because of severe pains in his feet. The blood pressure was 170/90 mm. Hg. and the pulse rate 96 per minute. The arteries in the supraclavicular fossae presented striking pulsations. The skin over the feet was dry and scaly with absence of hair. There were no pulsations in the dorsalis pedis, posterior tibial, popliteal, or femoral arteries of both lower extremities. The oscillometric index tested at the customary sites was zero. With the carotid sinus pressure test the blood pressure dropped from 170/90 mm. Hg. to 118/78 mm. Hg. in conjunction with an asystole of 1 to 2 seconds duration followed for the next few seconds by bradycardia.

Case 2.—S.P., a 68-year old white male was admitted to the Nursing Home on January 11, 1947, for the second time. In December, 1940, a left mid thigh amputation was performed in another hospital for arteriosclerotic gangrene of the toes of the left foot. The right mid thigh was amputated on May 17, 1943, because of arteriosclerotic gangrene. He developed pulmonary tuberculosis in December, 1944, and was treated for two years at Cleveland City Hospital. As far as the vascular status is concerned we found marked bilateral supraclavicular pulsations and the brachial arteries were tortuous but not beaded. A search for the femoral pulsations was futile. With the C.S.P. test the blood pressure dropped from 190/110 mm. Hg. to 130/90 mm. Hg. and remained at the lower level for over ten minutes. The pulse rate which was 72 beats per minute dropped for a few beats to a rate of 24 per minute.

Case 3.—This 57-year-old white male, F.S., was admitted to the Nursing Home on January 16, 1947, with a diagnosis of carcinoma of the right bronchus. There were no complaints referable to his legs. The arterial status revealed marked tortuosity and thickening of the arteries in both arms. The femoral pulsations were absent. No pulsations could be found in the dorsalis pedis, posterior tibial, or popliteal arteries on either leg. The collateral circulation appeared adequate, judging from the normal appearance of the skin, nails, and hair of the extremities and absence of complaints. The oscillometric index above the knee was less than 1 on the left side and less than ½ on the right compared with an index of 16 in the upper extremity. With right carotid sinus pressure the blood pressure fell from 196/94 mm. Hg. to 136/88 mm. Hg.

It is evident from the absent pulsations in the femoral arteries in these 3 patients that an extensive bilateral occlusive arterial dis-

ease is present. The question can be raised: Is this process confined to the femoral arteries or is it correlated with similar changes in other parts of the arterial tree? This point will be discussed later.

It should be pointed out that the abdominal aorta is frequently a site of great predilection for advanced atheromatosis (1). The roentgenograms in case 2 (figs. 2 to 5) not only confirm this finding in the aorta but also show arteriosclerotic changes in the iliac and femoral arteries. The beady calcifications in these roentgenograms are indicative of atheromatosis. It is interesting that in each of our 3 patients there was obtained a strongly positive C.S.P. test with a cardioinhibitory response and a marked vasodepressor effect as well.

Diabetes mellitus.—It seemed that, in view of the known prevalence of arteriosclerosis in diabetic patients (13), this group would serve as a proving grounds for the validity of our concept of the essential role of proximal atherosclerosis in a positive C.S.P. test. There is no other disease in which arteriosclerosis, especially atheromatosis, is so universal.

The C.S.P. test was performed on 13 consecutive unselected patients with diabetes mellitus ranging from 40 to 82 years of age who were followed for many months at the Cuyahoga County Nursing Home. Both cardioinhibitory and vasodepressor reactions were observed in these patients but it is worthy of attention that there was in every case a substantial drop in the blood pressure. The drop in the blood pressure varied from 30 to 64 mm. Hg., systolic, an average of 43.8 mm. Hg., and from 0 to 26 mm. Hg., diastolic, an average of 9.6 mm. Hg. There was little or no cardiac slowing in 7 of the 13 cases and a marked bradycardia or cardiac asystole in the remainder. The occurrence of asystole in 5 cases is not totally unexpected in the face of the high incidence of coronary arteriosclerosis among diabetics. More significant, however, is the occurrence of a steep fall in the arterial pressure in 7 cases without a concomitant bradycardia or a standstill. Clearly, the sustained vasodepressor response to the C.S.P. test, with or without the cardioinhibitory reaction, is characteristic of this series of diabetic patients.

Cerebral vascular accidents.—The C.S.P. test was applied in 10 cases of cerebral vascular accidents with long-standing hemiplegia. The following results were obtained:

Group 1.—Cardiac standstill.	1 case
Group 2.—Sustained blood pressure fall systolic—36 to 50 mm. Hg. diastolic—0 to 20 mm. Hg.	4 cases
Group 3.—Marked bradycardia to standstill and sustained blood pressure fall systolic—22 to 50 mm. Hg. diastolic—6 to 20 mm. Hg.	4 cases
No response—	1 case
Total	10 cases

There was a positive C.S.P. test in 9 out of 10 patients with cerebral vascular accidents. In the cases showing a sustained fall in the blood pressure this denotes, according to our point of view, the existence of advanced proximal atherosclerosis.

Discussion

Pathologically, according to Boyd (3), arteriosclerosis may be subdivided into three categories: (1) atherosclerosis or atheromatosis, which generally occurs in the elastic arteries, (2) medial or Mönckeberg's sclerosis, which is found in the muscular arteries of the extremities, and (3) diffuse hyperplastic sclerosis, which affects small arteries and arterioles.

From a functional point of view the atheromatous artery is the most important because, as a result of this process, either the caliber of the vessel lumen is greatly reduced by the formation of plaques, or an occluding thrombus develops on the roughened endothelium curtailing the blood supply to the part involved. Leary (9) estimates that atherosclerosis constitutes 90 per cent of the clinically important arteriosclerosis in human beings. However, the intimal changes which precede vascular occlusions may exist in subclinical form wholly unsuspected by the physician.

Unfortunately the diagnosis of atherosclerosis is at best uncertain and few of the clin-

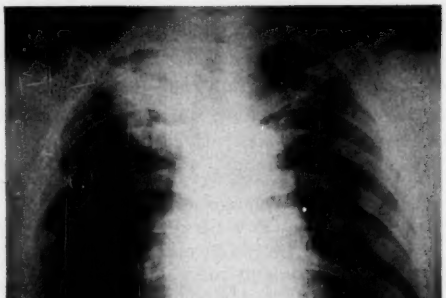

FIG. 2. S.P., age 68. Arteriosclerotic gangrene with bilateral mid thigh amputations. Note diffusely dilated and elongated aorta extending to sternoclavicular junction.

FIG. 3. Abdominal aorta, same patient. Note calcified atheromatous plaques.

FIG. 4. Same patient. Note calcified nodules and beads in the course of the iliac arteries.

FIG. 5. Same patient. Femoral artery in an amputated stump shows a string of beaded calcifications indicative of atherosclerosis.

ical methods available such as palpation, roentgenography, oscillometry, etc., are of much help in the early detection of this process. For example, the examiner may gain the impression that the rigid, tortuous brachial or radial artery in a given case is sclerotic. That rigidity and tortuosity are not necessarily signs of calcification of the artery wall was demonstrated above using bimanual compression. With suppression of the blood flow from above and below it was found that the supposedly rigid and tortuous brachial or radial artery had disappeared completely. On the other hand, the actual calcification of Mönckeberg's sclerosis is not obliterated by the bimanual technique. However, this type of sclerosis (the pipestem, tracheal ring, or gooseneck artery) though impressive to the examiner can be greatly overrated in diagnostic value. Some of the pipestem arteries in laborers whom we have examined were so thick that the pulses were imperceptible yet the individuals were not incapacitated. Also it should be kept in mind that medial sclerosis is limited to the muscular arteries of the extremities, especially the legs, and is not, therefore, indicative of either intimal changes in the vessels themselves or of arteriosclerosis elsewhere in the body.

Even more difficult than the diagnosis of atherosclerosis of the extremities is the assessment of the degree of sclerosis, if any, in the aorta and the great vessels. The diagnostic measures employed to this end are percussion of the mediastinal dullness, auscultation of the aortic area, and visualization of the aorta by roentgen ray. Percussion of the upper mediastinum except for aneurysms has proved unreliable in the diagnosis of arteriosclerosis of the aorta. Roentgen examination of the aorta is not pathognomonic of proximal atherosclerosis unless calcification is present. The value of the measurement of the width of the aorta even in the oblique positions is controversial. When elongation of the aorta is present by roentgen rays, hypertension must be ruled out. However, tortuosity and unfolding of the arch of the aorta are usually indicative more so of atherosclerosis than hypertension.

In view of the inadequacies of these diagnostic measures in the evaluation of atheromatosis of the proximal arteries, the carotid-sinus-pressure test proved to be helpful not only as a diagnostic aid but also in gaining a deeper insight into this process. It is known that the aorta and the great vessels are the sites of predilection for marked atheromatosis but the sino-aortic reflexes also have their receptor endings in these areas, a fact which accounts for the high incidence of positive C.S.P. tests in such cases. Inasmuch as the sino-aortic apparatus helps to maintain the normal blood pressure level, atherosclerotic changes in the proximal segment of the arterial tree disturbs the counterregulatory pressoreceptor activity to such an extent that digital carotid sinus stimulation actually provokes a marked, sustained drop in the systemic blood pressure.

In patients with a positive C.S.P. test we found in a high percentage of cases pulsating arteries in the supraclavicular fossae and less frequently in the suprasternal notch. Ordinarily the subclavian and innominate arteries are not palpable. When they are present we feel justified to assume that the pulsations of the innominate and subclavian arteries indicate in the main their displacement by an elongated and/or dilated aorta and, further, providing essential hypertension can be ruled out, that these findings are diagnostic of atherosclerosis of the aorta and the adjacent great vessels.

As mentioned above in the early stages of this study, we encountered 3 patients with bilateral femoral artery obliteration in whom a strongly positive C.S.P. test was obtained. In conformity with our views, the positive test also calls attention to the existence in these patients of advanced proximal atherosclerosis. The fact that vessels as large as the iliac and femoral arteries are affected by advanced atheromatosis to the point of complete obliteration on both sides should not be altogether surprising in view of the fact that they represent the transition from the purely elastic (aorta) arteries to the muscular arteries.

On the basis of these 3 cases of bilateral femoral or iliac artery obliteration, each giv-

ing in addition a positive C.S.P. test, one might draw the conclusion that the atherosclerosis producing the occlusions at least on these occasions appears to be a contiguous process extending distally from the aorta. This view is supported by the findings of Lisa, Magiday, and Hart (11). The presence of atherosclerosis simultaneously in the thoracic and abdominal aorta, the iliac and femoral arteries is clearly shown in the roentgen rays from one of our cases (case 2, figs. 2 to 5). Keith and Horton (8) reported 4 cases with intermittent claudication, 3 of whom had no femoral pulsations. Although no mention was made of roentgen rays of the iliac and femoral arteries, all of their cases showed calcification of the abdominal aorta by roentgen rays. One of their patients even complained of claudication despite the presence of normal pulsations in the femoral, popliteal, and dorsalis pedis arteries. This case in particular strengthens the idea that atheromatosis originates in the aorta.

Hence it can be concluded from all these findings that obliterative arteriosclerotic manifestations in the lower extremities may sometimes be purely regional but can be considered at other times as an atherosclerotic process which arises in the upper arterial trunks. At present we employ the C.S.P. test in every case of peripheral arterial disturbance for information as to the status of atherosclerosis in the proximal segment and, by inference, of the distal portions of the arterial tree.

The validity of our concept that the C.S.P. test is diagnostic of atherosclerosis in the proximal arteries appears to be further substantiated in the group of 13 diabetic patients, every one of whom showed an abnormal reaction to carotid sinus pressure.

The positive results obtained in 9 out of 10 patients with cerebral vascular accidents merit a few words. Fischer and Schlayer (4) have pointed out that atherosclerosis is commonly more pronounced in the carotid arteries than even in the femoral arteries. The extension of the atheromata into the branches and the formation ultimately of occluding thrombi can be assumed. The etiology of cerebral vascular accidents is usually attributable to a thrombus, hemorrhage, or embolus. None of these patients had syphilis. It is now known that in the majority of cases of cerebral vascular accidents an occluding thrombus is found in one of the cerebral vessels in association with intimal sclerosis or atherosclerotic plaques. If one might be permitted to interpret the results in our small series of patients, the positive C.S.P. tests favor the presence of atherosclerosis at least in the proximal arteries. If the same process can be assumed to extend into the cerebral vessels, it seems more logical to anticipate as the underlying lesion of a vascular accident a thrombosis in the region of an atheroma than actual rupture of the artery with hemorrhage.

We have had two untoward experiences with the C.S.P. test. The first instance occurred in a 67-year-old white male with myelogenous leukemia who developed a left hemianopsia immediately following pressure on the right carotid sinus. The vision returned to normal in a few days. The second patient was a 71-year-old white male with emphysema and advanced atherosclerosis who developed a monoplegia of the left arm after pressure on the right carotid sinus. The function of the arm recovered in one month. It is, therefore, advisable to employ the C.S.P. test with caution in patients in whom far advanced atherosclerosis is suspected.

In the present communication we have not dealt at great length with the C.S.P. test as it relates to hypertension. However, we have emphasized elsewhere (15) the importance of differentiating true or essential hypertension with elevated diastolic pressures from arteriosclerotic hypertension in which the diastolic pressure is low. In the large majority of our cases the systolic readings reached 150 to 200 mm. Hg., whereas the diastolic pressures were below 100 mm. Hg. These findings, when correlated with the positive C.S.P. reaction in these patients, would seem to point to an arteriosclerotic origin of their high systolic pressure. In fact we consider a diastolic pressure below 100 mm. Hg. as being arteriosclerotic rather than hypertensive regardless of the height of the systolic pressure. On the

whole, cases of true hypertension were relatively infrequent in this series although the patients were unselected.

Despite the controversy over the pathogenesis of atherosclerosis its clinical importance is beyond dispute. It is hoped that in the C.S.P. test an additional procedure diagnostic of this vital process has been supplied. Inasmuch as the sino-aortic mechanism is lodged in the proximal portion of the arterial system the abnormal responses point to atherosclerotic changes primarily in this area. In addition, however, as we have attempted to demonstrate, atherosclerosis may extend from the elastic arteries to the distal parts of the arterial tree.

Summary

In employing carotid sinus pressure in a series of patients, three characteristic cardiovascular reactions were found: 1) bradycardia or cardiac standstill (cardioinhibitory effect), 2) a clear, sustained drop in blood pressure (vasodepressor effect), and 3) a combination of these two (mixed effect).

The concept is advanced that the vasodepressor effect is dependent on the presence of atherosclerosis in the aorta and the great vessels in which is lodged the sino-aortic apparatus.

A drop in the systolic pressure greater than 20 mm. Hg. and persisting over 3 minutes is considered to be indicative of atherosclerosis of the aorta and the adjacent great vessels, conveniently termed proximal (central) atherosclerosis. Under this heading are included the aorta, innominate, subclavian, and common carotid arteries. Marked pulsations in these vessels were of such common occurrence in the cases with positive carotid sinus pressure (C.S.P.) tests that they proved to be of diagnostic importance.

Palpation of the superficial arteries is discussed and a bimanual method of palpation is presented.

In essence, the positive C.S.P. test especially the vasodepressor response is diagnostic of advanced intimal sclerosis or atheromatosis of the proximal segment.

Inferentially, the C.S.P. test can also be of use in the diagnosis of occlusive atheromatous disease of the peripheral segments of the arterial tree, as, for example, the extremities and the cerebral arteries. Evidence is brought forward to support the conclusion that atherosclerosis in the peripheral arteries may be part of a generalized atheromatosis extending from the aorta throughout the arterial system.

References

1. Allen, E. V., Barker, N. W., and Hines, E. A., Jr.: *Peripheral Vascular Diseases.* W. B. Saunders, Philadelphia, 1946.
2. Bell, E. T.: In Cowdry, E. V.: *Arteriosclerosis,* Macmillan, New York, 1933.
3. Boyd, W.: *Pathology of Internal Diseases,* Lea & Febiger, Philadelphia, 1940, third edition.
4. Fischer, H., and Schlayer: Arteriosklerose und Fühlbarkeit der Arterienwand. *Deutsches Arch. f. klin. Med., 98:* 164–185, 1910.
5. Hering, H. E.: *Die Karotissinusreflexe auf Herz und Gefässe.* Steinkopff, Dresden, 1927.
6. Joslin, E. P., Root, H. F., White, P., Marble, A., and Bailey, C. C.: *The Treatment of Diabetes Mellitus.* Lea & Febiger, Philadelphia, 1946, eighth edition.
7. Keele, C. A.: Pathological Changes in Carotid Sinus and their Relation to Hypertension. *Quart. J. Med., 2:* 213–220, 1933.
8. Keith, N. M. and Horton, B. T.: Intermittent Claudication Associated with Sclerotic Lesions of the Abdominal Aorta. *Internat. Clin., n.s. 3: 2:* 21–30, 1940.
9. Leary, T.: Experimental Atherosclerosis in the Rabbit Compared with Human (Coronary) Atherosclerosis. *Arch. Path., 17:* 453–492, 1934.
10. Lewis, T.: *Diseases of the Heart.* Macmillan, New York and London, 1937, second edition.
11. Lisa, J. R., Magiday, M., and Hart, J. F.: Peripheral Arteriosclerosis in the Diabetic and the Nondiabetic: A study of One Hundred and Six Amputated Legs. *J. A. M. A., 118:* 1353–1356, 1942.
12. Pal, J.: Hypertonie der Arterien. *Deutsche med. Wchnschr., 56:* 2205–2208, 1930.
13. Root, H. F., and Sharkey, T. P.: Arteriosclerosis and Hypertension in Diabetes. *Ann. Int. Med., 9:* 873–882, 1936.
14. Thayer, W. S., and Fabyan, M.: Studies on Arteriosclerosis, with Special Reference to the Radial Artery. *Am. J. M. Sc., 134:* 811–829, 1907.
15. Wassermann, S., and Goodman, J. I.: Clinical Aspects of the Hyperactive Carotid Sinus. *Exper. Med. & Surg., 5:* 363–374, 1947.

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Homes, Hostels, and Other Institutions for the Aged

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IN ADDITION TO THE USUAL TYPES OF CONGREGATE LIVING ARRANGEMENTS FOR OLDER PEOPLE, DR. MOORE ALSO DISCUSSES SOME OF THE NEWER—OLD AGE HOSTELS, COOPERATIVE CLUBS, AND RETIREMENT COMMUNITIES. FACTORS CONTRIBUTING TO SATISFACTORY LIVING ARRANGEMENTS AND THE NECESSITY FOR PLANNING IN ORDER TO SMOOTH THE TRANSITION FROM ONE TYPE OF LIVING TO ANOTHER ARE STRESSED.

THAT an institution for older persons is a place of last choice and last resort is a view widely held in America. The old people's home, public or otherwise, for many of us presents a stereotyped idea associated with crowding, neglect, poverty, and unwanted persons. This stereotype rests partly on ignorance and it has been strengthened by the occasional drab accounts of our worst managed institutions. That it has characterized the attitude of Americans for many decades is suggested in the verse of Will Carleton in "Over the Hill to the Poor House." Writing in the 1870s, it was unnecessary for Carleton to describe the poor house; the mention of the institution conveyed the desired impression.

In spite of unfavorable publicity and attitudes, institutional provision for the aged is well rooted both in tradition and present practice. County farms, municipal, and other almshouses care for possibly 80,000 of the older population. This number is an estimate. The study of the Bureau of Labor Statistics in 1923 to 1924 reported on 2183 public almshouses with a population of 85,889. Since some 7 per cent of the known almshouses failed to report, the actual population was in excess of this figure, possibly in the neighborhood of 90,000. While Social Security provisions for the aged have since then somewhat reduced the necessity of the almshouse for economic needs, the number requiring some custodial care has doubtless continued to increase with our aging population.

Old people's homes sponsored by lodges, churches, national and private groups account for many more. These in 1939 totaled over 1400 homes with an estimated population of close to 90,000. Probably between 160,000 and 170,000 of our aging population are cared for in public and private homes not including custodial institutions for feeble-minded, mentally ill, and others. In terms of total population this represents only about one in 800 who are living in public or private homes. In terms of those over 60 it represents over 1 per cent. Of those who pass the age of 70 probably close to 3 per cent sooner or later seek the institutional home.

More recently there have appeared new developments in terms of old age hostels, cooperative residences, cooperative boarding homes, and even cooperative communities for older persons. Closely related to these developments is the mounting attention given to the problem of housing for older persons, especially throughout the countries of northern and western Europe.

Since our concern is with retired persons who have some degree of choice, attention will be centered on the optional provisions for ambulatory persons. Only incidentally will the provision of nursing homes and the care of the ill and bedridden be approached.

Congregate provision for older persons is now concerned and doubtless will in the future be concerned with care for only a small

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minority of retired individuals. Those who have their own homes and their roots in a stable neighborhood will in most cases prefer to remain in the old location as long as they are able. Many others will seek location with or near to children; still others prefer a roving trailer life with the new experiences which that can offer. A very large number, whatever their lot, prefer to retain every shred of independence so long as that is possible, and they fear that they would lose this independence in a congregate living arrangement.

In opposition to these there are many who may welcome certain congregate provisions. Contemporaries are gone. Close friends and relatives are in other locations. One finds himself a tolerated stranger in a community with interests and activities attuned to a younger age. He—and more often she—may discover that their social needs are being starved, that life consists mainly of memories of past adventures. New associations and new experiences are largely denied to them. For such persons some form of group-living among those of their own age can provide many satisfactions not available in independent living. That the number who have reached this decision far exceeds the present capacity of homes for older persons is evidenced by the long waiting lists for admission to these homes. Few indeed are the good private institutions which can promise admission within several months or even years of the application for such admission. As a result the age composition of members of such homes is much older than would be the case were the facilities in keeping with the demand.

Contrary to a widely held view, the addition of the old age provisions under Social Security has not reduced the demand for congregate residence. In fact there is some evidence to support the view that it has increased the demand by providing the funds which make possible such a living arrangement. If all homes for the aged were charity institutions and if one sought such homes only because of economic need, then the security provision might logically result in a lessened demand for such locations. Actually older persons who are not in straightened circumstances often welcome the congregate arrangement since it frees them from certain responsibilities in the routine of independent living and makes available a social and activity experience otherwise denied to them. Further, the Old Age Assistance agencies of many cities have frequently encouraged the congregate arrangement by increasing the allotment to older persons in order to make it possible.

Not only is there an acute shortage of congregate provision for older persons—it promises to become more acute. In less than thirty-five years the number of those 60 and over will be doubled. Those 70 and over will be nearly trebled. The rapidly increasing number of those in the older years would alone justify marked increase in types of congregate provision.

Associated with the increase in numbers are the increasing problems of independent living for older persons and the increasing absence of buffer and supporting family and neighborhood groupings. These conditions for many make the congregate arrangement more acceptable.

Should there be a distinct improvement in the quality of homes for older persons and should the limitations of crowding and other sources of irritation be removed, we will see a significant increase in the number seeking residence in homes for the aged.

Factors in Congregate Living

Some of the limitations in previous and present arrangements for congregate living arise from the fact that the number of persons

seeking and being admitted to such homes far exceeds the facilities which those homes can offer. Except for those homes which hold fast to a fixed limit well within the range of satisfactory living arrangements, crowding and lack of privacy results. Then the desirable provision of single room or apartment for each person or married couple becomes impossible.

This retention of one's domain over even a single room, a room which is one's own and to which one can retire to escape even temporarily the irritations which may arise in any group relationship, is of first importance. Such a domain is desirable whether in a home for older persons, in a home with relatives, or even in the normal family grouping. The equinimity which we experience in social relations at any stage of life is in part made possible by our ability temporarily to escape mounting irritations in some retreat where the irritations do not follow. Whatever the social group there are usually some persons we do not like or at least with whom we experience irritations. Many who solve a partial sharing of life with such persons do not experience the same ease when there is no escape.

In this connection arises the importance of a diversified program of interests and activities for congregate living groups. Not only may each follow his or her own bent, but such a program offers the chance of altering the immediate group contacts. It is further important that the member of a congregate living group be able to seek and maintain social contacts outside the group. Many homes definitely encourage the practice, and the member is free to visit outside friends and to entertain these same friends at the home. The few studies of institutional membership which touch on this point suggest that those who retain such outside associations are happier than those who do not. Further work needs to be done on this point. Those without outside contacts include many who had lost most of their social contacts prior to participation in a congregate living group. In any event the outside associates provide a balance in the social experience of the member and may do much to keep alive interests which might otherwise decline in the smaller world of the home.

Of equal importance and a point already anticipated in the preceding paragraphs is the degree of freedom accorded members of the congregate living plan. In homes where the communal arrangements are few in number with separate kitchens and separate living quarters, a large degree of freedom is inherent in the very nature of the arrangement. Even in a program with many communal aspects freedom of the person need not suffer serious restriction.

In one of the best homes known to the writer, the members themselves exercise control over their own social activities. Further, they are free to come and go as they wish with only the necessity of leaving word at the office if they plan to remain away beyond the dinner hour or overnight. This last is not in the nature of seeking permission but to avoid concern over those who are not present after certain hours. Essential to the sense of freedom is a certain amount of spending money to use as one desires, either wisely or foolishly. Some can make such provision from their own savings. Where there are no savings and relatives do not make such provision, there should be allotments made from a common chest or by the home itself.

When no control is exercised over types of people admitted and little attention given to the neighbor relationships in congregate living, extreme dissatisfaction may result. The public almshouse frequently fails on these two scores. Homes maintained by fraternal and church bodies may also experience some difficulty in this connection. However many of the private homes give close attention to these items. In the larger home a wide variety of personalities and cultural backgrounds may be accommodated without a straining of agreeable relationships. In the smaller community a greater homogeneity needs to be sought even at the expense of the stimulations which may come from a more diverse group.

The success of any congregate living arrangement depends most upon an adequate budget and wise management. Many prob-

lems, and especially those pertaining to privacy and freedom, arise from inadequate budget provisions. So long as the extreme shortage in congregate living arrangements continues some homes will choose to serve the larger number at the expense of meeting essential provision for a smaller number. Furthermore, homes are occasionally established without a knowledge of the full costs of providing the essentials for congregate living. Many of these costs, such as nursing and medical care, do not assume their full proportions until after several years of operation.

The average annual per capita cost in homes for older persons was well above $400 in 1929 when the Bureau of Labor Statistics made its investigation. The average cost for reasonably satisfactory provisions doubtless averaged close to $600 in that year. In sixteen homes the per capita cost was over $1,000 and in two of these over $2,000. In one large and well-managed private home the annual per capita costs for 1942 to 1944 were slightly over $800. Even had the present (1947) price rise not occurred, it is doubtful whether satisfactory provision of all services could be given for an annual expenditure of less than $600. With the recent increases in prices the present cost must be much in excess of this figure. Naturally if good standards are not maintained, if crowding is practiced, if medical and nursing service is limited or not provided, and if as in certain church-sponsored homes most of the services involved in direction and operation are free, the costs may be well under this amount.

Of equal or even greater importance than an adequate budget is the quality of the management. This is usually centered in the matron or superintendent, assisted by an executive committee chosen from the trustees or board of directors. In homes which grant reasonable freedom to the matron or superintendent, these become key functions which may determine the spirit of the home itself.

"Almost invariably the low-grade matron, the dreary home, and the dull-looking inmates were found together. The dreariness of the home was not a matter of furnishings or material comforts, necessarily. Some of the shabbiest homes were the happiest. It usually meant that the matron didn't care or know how, or lacked the 'homemaking touch.'" (2)

Occasionally problems arise from the assumption of parental authority and overdirection on the part of the matron. However this condition was found in only a small minority of private homes by the Bureau of Labor Statistics in their study of 1929 (2).

Types of Congregate Provision

Congregate living arrangements include both free homes and pay homes. The free homes may be available to all but more frequently they are restricted to members of a lodge, church, union, or other groups. One such home in Chicago is restricted to impoverished men of former wealth or position. The pay homes sometimes require a lump sum payment ranging from a few hundred to several thousand dollars in return for which the home agrees to care for the member for the rest of his days. Some homes require the transfer of all properties, others have a monthly or yearly fee. In cooperative ventures the communal costs are usually shared.

The types of congregate provisions range from the public almshouse to cooperative communities.

The Almshouse.—Normally one does not regard the public almshouse or county farm as a home a person would ordinarily choose. However many who reach retirement years without savings have no other choice, especially in their later years when a degree of custodial care becomes necessary. Moreover some with small savings occasionally make the necessary transfer of their savings to the township, county, or city in exchange for a home at the almshouse. At one county farm in Illinois an elderly woman made this arrangement. Arriving in this country after her husband's death, she found that living with either of her two married daughters in their crowded homes proved unhappy. At the county farm she had her own room and busied herself with fine needlework. In the same home was a childless couple who, after the loss of most of their small savings, accepted the security of the almshouse in exchange for a precarious

existence. With adequate facilities and under intelligent management the public institution can provide the desirables of privacy, companionship, interests, and small duties and responsibilities in such proportion as to make life not only bearable but also enjoyable. Here again, granting reasonable facilities, the superintendent and matron represent the keystones of success or failure.

Fraternal, Church, and Union Homes.—Some 537 homes are sponsored by denominational groups, another 129 by fraternal groups, and a small number by union groups. The fraternal and union homes are restricted to those who have been continuous members of the organization for a specified number of years; often their wives or widows are also included. Some of the denominational sponsored homes are restricted to members of the sect, but frequently this is not a requirement for admission. The church sponsored homes in the majority of cases require entrance fees while this practice is rare in fraternal or union sponsored homes. The fraternal and union homes which, as in most cases, are supported by annual assessments on all members appear to be more adequately financed than those which rely upon free will contributions and fees as is more frequently the case with church sponsored homes. The low median admission fee of under $600 charged by the homes which use the fee requirement clearly meets but a small part of the maintenance cost for the average member. It may be useful as a basis of selection but leaves most of the costs to be provided from other sources. The large number of homes sponsored by religious and fraternal bodies permits the widest range of provisions between the best and the poorest.

Private Benevolent Homes.—Some 451 private benevolent homes were reported in 1939. Many of these are the result of endowment. Some of these are amply financed from this source alone. There is however a general tendency for homes once adequately endowed to find that this source becomes inadequate as prices advance. In these cases the shortage is covered by increased fees or contributions.

Admission to a number of the private homes is based upon occupational or professional requirements, and sometimes the length of time the individual has lived in the community is also a factor. A few are designed for those from former upper class positions. Many provide that one shall not have been a recipient of public relief.

Residential Homes, Old Age Hostels, Cooperative Clubs.—Other varieties of congregate provision are found in residential homes, old age hostels, and cooperative clubs.

The residential home provides a number of separate living apartments which provide privacy of living arrangements together with communal services of dining and recreation rooms for those who wish to utilize them. The degree of supervision is in most cases not much greater than in the usual apartment house. The residents enjoy the greatest amount of freedom. These homes are only to a limited degree benevolent in nature. The home usually assumes no lifetime responsibility. A monthly rate is charged for the apartments and separate charges are made for cafeteria and other services. Further medical and hospital care is the responsibility of the resident. Residential homes meet the comfortable living and association needs of those who can afford the costs of more or less independent living at the level provided within the home. It is an excellent solution for those who have the necessary economic resources.

Old age hostels, a development started by the Friends group in England during the war, proved of such value that the provision is being continued into the after-war period. Hostels are designed to care for some fifteen to twenty-five older persons. According to its sponsors it may meet the needs of "the lonely who need supervision but not skilled care," the infirm, and even many of the seriously infirm if the nursing needs can be met in a communal home. Hostels as they have developed are both benevolent and communal in nature. They seek to provide about the level of accommodations enjoyed in earlier years.The estimated annual per capita costs of hostels is about $500 (3).

Somewhat similar to the hostel is the de-

velopment of the cooperative residence club in certain of our cities. Some of these are purely cooperative with the residents sharing all costs and work; others receive benevolent support from church or other organizations.

Retirement Communities.—Several experiments in retirement communities have claimed the attention of persons interested in congregate provisions for older persons.

A small group of older persons was established in a neighborhood arrangement with separate living houses at Millville, New Jersey, in 1937. Some twenty old men and women were located in three room cottages where they continued their independent living at low cost. Two years before this there was inaugurated in the cut-over lands of the state of Washington a number of cooperative communities for elderly single men. The housing was provided by the abandoned cabins formerly used by the loggers and mill workers. Three such cooperatives were developed in rural areas and later four more, one for elderly women, developed in urban areas. Most of the residents were recipients of old age assistance. The cooperatives were entirely self-supporting with an average per capita cost of from $16 to $20 per month. In each case some established group in the community sponsored the undertaking, but this sponsorship did not entail financial assistance aside from the establishment of credit for the ventures in their initial stages. The guiding hand of these sponsoring committees is credited with insuring many of the stable benefits offered by these communities. Such congregate arrangements may offer real social experience and ties to elderly persons without families or homes.

The few experiments in retirement communities have so far been self-financed and necessarily small. Several represented a response to depression engendered needs and were for single elderly persons; the accommodations for the most part were not appealing. A few communities have attracted a number of well-to-do retired people, but there has been no development for the large middle class group. Just before World War II Lawrence K. Frank proposed such communities in an interview with a reporter. His suggestion received national attention, and many letters from persons eager for such participation came from all parts of the country.

Mr. Frank visioned a modern community in a mild climate. The homes would be individual in nature with independent family living, but the community would provide a number of community services. In the milder climate the aging would be free from snow, slippery walks, and the long winter stay indoors. There would be community dinners, dances, shuffleboard, and many-interest clubs. Shops would be available in which residents might secure space for the carrying on of constructive activities. Physicians and hospitals would be ready for the treatment of the ailments of the later years. Each resident would be a free agent and would pay his own way. Each community would be small (with at the most a few hundred persons) but close enough to each other to provide inter-community contacts.

In such villages the elderly enjoy a rich social life attuned to their age and at the same time continue or discover enduring interests. Seeing others their own age attempting new experiences would arouse many from a state of old age lethargy. These retirement villages could provide stimulation without the complexity of the larger city. They could meet the social needs of the person without the confusion of impersonal contacts. They could provide shops, minor industries, and service outlets developed by the residents themselves with resulting compensation for efforts. They would offer leadership opportunities in the community life which would be denied or unavailable in previous living locations. They could provide all the freedom of independent households without the wearing duties which often accompany living in the city or in former homes. The communal provisions would be optional but of the type which give convenience, interest, and variety to life and would be shared at much lower cost than would be possible in a more commercialized center.

As with other such provisions, retirement communities will not meet the needs of all. If

but 5 per cent of those reaching retirement age welcomed this solution we would need many such communities.

The difficulty with such a development is the problem of financing the construction and early development. Some of the lighter work could be left to the residents, but there would be a large initial cost for labor and materials which would have to be amortized over the years which followed. This, Mr. Frank believes, could be provided by large insurance or philanthropic agencies who, as they provided for investment of their funds, could at the same time meet a growing need.

It appears that Mr. Frank's suggestion gives much promise. Using the standards of selection already developed by the better homes, the aged would have assurance of agreeable living relationships and also of the financial soundness of their community. With provision for independent living social relationships would present fewer problems than in the close grouping in an old people's home. This proposal deserves serious attention on the part of philanthropic and financial agencies. Many thousands of professional and other middle class couples would welcome the opportunity to share such an experience if assured of reasonable cost, acceptable neighbors, freedom of action, and absence of charity classification.

Preparation for Home Living

Many of the difficulties which attend the entrance of a person into a home for older people result from failure to make earlier plans and preparation. The decision to seek such location frequently comes only after other solutions have failed and after savings are exhausted. In such cases there has usually been no careful weighing of the advantages of different homes. Also no funds remain for the entrance fee should this be required. Further, there may be a long waiting period, even after the approval for admission. That unhappy choices are made at this late date is inevitable. In contrast, a few plan ahead for home membership long before the time they expect to share that experience. One should select his home as he would choose his wife or his house with deliberation and not as is too often the case in desperation.

Often, especially in the case of widows and widowers, there exists the added difficulty of overcoming the objection of children and friends. Even when membership in the home of one of the children may mean needless irritations and unpleasantness for both the older and younger generations, children are often insistent and in their pride protest the right of the aging parent to make the decision which appears wisest and most in keeping with comfort. One writer (1) holds that this difficulty would not arise if one did not arrive at old age intestate without plans for our old age. An understanding with children and friends long prior to old age, together with the earlier meeting of admission requirements, economic and otherwise, will do much to make the transition to a home both an easier and more pleasant one for those who desire this adjustment.

Summary

Although the attitude that homes for the aged are places of last resort is widely held, and although congregate arrangements will probably never provide for more than a small minority of our population, there is a growing number of aged who desire or find necessary some type of congregate living. The long waiting list for admission to such institutions is convincing evidence.

Homes for the aged and other forms of congregate living can be good or bad. The retention of friends and contacts outside the home, the degree of freedom within, the opportunity to escape temporarily from irritations within the home, some spending money that is one's own, and a wise and sympathetic matron or superintendent—all these factors help in making home membership a more satisfying experience.

In addition to the traditional types of congregate living found in fraternal, church, labor union, and benevolent homes, new types have developed in recent years. Residential homes and cooperative clubs for the aging have been organized in several cities, and old age hostels started during the war are being

continued in England. There is also some attention both in theory and practice to retirement communities in which communal services are available without limiting the freedom and integrity of the family grouping. The transition to the home or other form of congregate living will be easier for the aging person if plans for such living are made well in advance of the time of entrance.

References

1. Anonymous: Old Age Intestate. *Harper's Monthly*, 547–554, Oct., 1928.
2. Bureau of Labor Statistics: *Homes for the Aged in the United States*. Bull. no. 489. U.S. Department of Labor. U.S. Government Printing Office, Washington, 1929.
3. Friends Relief Service: *Hostels for Old People*. Friends Book Center, London, 1943.

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Philadelphia's Recreational Project for Older People

GEORGENE E. BOWEN

THE FIRST ATTEMPT IN THIS COUNTRY TO ORGANIZE RECREATION CLUBS FOR OLDER PEOPLE ON A CITY-WIDE BASIS WAS BEGUN IN PHILADELPHIA IN JUNE, 1946, AND THE SUCCESS OF THE ENTERPRISE HAS ATTRACTED NATION-WIDE ATTENTION. AS A PRACTICAL AND IMMEDIATE STEP IN SERVICES FOR THE AGED, IT IS INSPIRING OTHER COMMUNITIES THROUGHOUT THE COUNTRY TO ESTABLISH RECREATION PROGRAMS. MISS BOWEN DISCUSSES THE ESSENTIALS OF ORGANIZATION AND ADMINISTRATION OF THE PHILADELPHIA PROJECT.

THE dawn of a new day is already shedding some of its glow throughout this vast country where there is an increasing awareness of, and interest in, the welfare of older people. On the horizon of Philadelphia these rays have been growing and expanding with unusual brilliance as the hope is being realized that, here and now, a happier, healthier life may be brought to many older people—a life that can be looked forward to with pleasure, interest, and confidence.

If this comes as a recreating power to older people, it also brings great satisfaction to those who take part in helping bring about this brighter day. Watching so many of them come back to life and find enjoyment, calls forth a deep desire to take an ever more constructive part in this worth-while enterprise.

In the accomplishment of this task there is a job for everyone. Unlimited sympathy, understanding, skill, and material resources are required. These instruments have already laid the foundations for the new life for older people—a rebirth that is now taking shape in Philadelphia in the organization and operation of recreation clubs.

For today there are 2059 people over 65 years of age meeting almost every week in 42 clubs throughout the community. They are literally having the time of their lives dancing, singing, chatting, playing games, and making new friends. Life for them has taken on a new importance and an unexpected radiance.

What this opportunity means to them can best be expressed in their own words, and all of them are eager to talk about it. Perhaps it was most sublimely revealed by one older woman who said: "God opened a door. That's what He did! He opened a door for me. I had long been convinced that nobody wanted old folks around and there was nothing for us to do but sit and wait to die. Then one day I received a card inviting me to attend a club. When I went and met other older folks like myself who were friendly and sociable, it was like having a door open into a new world."

Physically handicapped though many of them are, they attend their club meetings and enjoy the privilege of being together in a happy atmosphere of friendliness and fun. For instance, at the close of the first meeting of one of the clubs, one elderly lady groped her uncertain way across the room to the leader and said, "I want you to know that even though I see hardly anything and I can't hear well, I had a *wonderful* time."

They go out in cold and heat, rain and snow. Often they call for and help one another like the gallant gentleman who said, "Now, Mrs. Brown, don't you worry if it snows again like this. You needn't stay at home even though your feet trouble you. I can come for you with my wheelbarrow!" To get to their club they go by bus, by trolley, by train, and on

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She was appointed social work missionary to Japan under the Universalist Church from 1925 to 1947. Her experience, both in the Orient and in the United States, has included teaching, group work, social work administration, and community organization.

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A speech by Miss Bowen, given at the Conference on Aging Successfully Through Recreation, sponsored by the Philadelphia Recreation Association and the Division for the Aged of the Health and Welfare Council, Inc., January 6, 1948, formed the basis of this paper.

foot. The oldest person who attended a club meeting was 103. He walked eight blocks to and from the meeting, and in Philadelphia that is two miles.

The Philadelphia recreation project originated in October, 1943, when the Division for the Aged, Council of Social Agencies, appointed the Committee on Unmet Needs for Older People. They began their study of the needs of older people in the community with the purpose "to set in motion forces which can, in some measure, meet these needs." When they learned of experiments in Cleveland with recreation clubs, the Division for the Aged and the Recreation-Education Division of the Council joined in recommending and requesting the promotion of an adequate recreational program for older people in Philadelphia.

A few clubs were started experimentally in 1944, and in 1945 it was decided that a consultant should be secured to promote and give guidance to this work. The Philadelphia Recreation Association was asked to sponsor this undertaking. An Advisory Committee on Recreation was appointed and the work of extensive promotion was begun in June, 1946.

There were certain facts to be taken into consideration in undertaking this social experiment. There was a population in Philadelphia of 135,894 persons over 65 years of age. Twenty-eight per cent of these were receiving Old Age Assistance or Old Age and Survivors Insurance Benefits.

Recreation clubs for these people were requested and their organization had to be on a city-wide basis. No buildings and no staff were provided for the purpose, and there were no additional funds available to organizations who opened their facilities to older people. All that was offered the sponsors was a little expense, much effort, and great satisfaction. In other words, the total program had to be built from scratch with the human and material resources that already existed in Philadelphia.

To reach out into the community the cooperation of all the organizations and agencies that could and would exert their influence in behalf of older people was needed. Those who have cooperated in the effort include: Health and Welfare Council, Inc., Federation of Jewish Charities, Department of Public Assistance, Bureau of Recreation, Association of Philadelphia Settlements, Family Society, Visiting Nurses, Board of Education, Social Security Board, County Medical Society, Armstrong Association (Negro), Council of Churches, Bryn Mawr College, University of Pennsylvania, Temple University, religious organizations, housing projects, homes for the aged, service clubs, boys clubs, "Ys," and veterans organizations.

In the organization of recreation clubs three points were emphasized. The first was strong and dependable sponsorship, for all effort would be lost and the older people disappointed if it were not reasonably sure that the sponsoring organization would offer continual funds, facilities, and leadership.

The second point urged upon the sponsors and club leaders was the encouragement and safeguarding of democratic procedure at all times. The greatest value to the older people was the right to make their own decisions and to follow through on a program of their own choosing.

This policy proved to be an eye opener,

for when the older people were given the opportunity they made varied and often amusing choices. There were, for instance, two older women who, when they visited the park, always chose to take a slide on the shoot-the-chutes. One man, at a club's first meeting in a school gymnasium, seemed bored with the entertainment and games that had been carefully planned and looked wistfully at the basketball backboards. "I wish we had a basketball so I could shoot some baskets," he said. Then there was a group of older women who were entertaining themselves one evening amid gales of laughter. As the hilarity increased, the leader looked in to see what they were up to. Some of them were trying to turn somersaults.

One group of men seemed to enjoy being grumpy to one another. At first the leader thought his program was failing but later came to the conclusion that the old people were getting great satisfaction out of being disagreeable with impunity. This phase of unpleasantness passed, and most of the workers were impressed again with the fact that the choices a group would make and in what specific activities they would find therapeutic value could not always be foreseen.

The third essential point in organization was the encouragement of the maximum participation of members. Some of them might choose to sit or watch the activities, but in general it was assumed that most would want to take some active part in the program if given a chance. This encouragement is paying rich dividends to the participants. It has been found that even greatly handicapped persons can find some job to do in helping to make the club a success.

For instance, there is one man who has taken upon himself the task of distributing and collecting song books. He resents having anyone deprive him of this job, even though he has a wooden leg, only one eye, and one useful hand. In another club meeting, when the members were discussing what they would like to do, one of the men said, "If I only had an accordian, I'd like to play it for everybody. Once I owned one and I played it well." Fortunately the leader heard his remark and offered to lend him her own instrument. Thereafter, with a little practice, he entertained his club members with his once-favorite selections. He became the life of the party.

Because of the encouragement of individual club decisions, there are no two clubs in Philadelphia exactly alike. In the first place, they have selected varying names, such as Golden Age, Jolly Club, Happy Hours, Good Companions, Friendly Neighbors, Sunshine Club, Seniors Club, Friendly Excelsior, Willing Workers, and Old Timers.

Their programs of activity show exceptionally wide and varied interests. They are already enjoying party and table games, vocal and instrumental music, their own rhythm bands, painting, ceramics, dramatics, dancing, crafts, billiards, ping-pong, shuffleboard, quoits, discussions, poetry, business meetings, parties, trips, movies, lectures, and spelling bees.

Interests within groups vary even at the very first meeting. It is never known until groups assemble for their first meeting what activities will appeal to them. Some enter into singing with obvious pleasure, others enjoy business and discussion, some immediately choose table games, others like painting or lectures on art. One group said the first day, "We don't want to do that silly stuff. We want to pray and have Bible stories!" And so, the beginning is made where their interest is strong and new and varied activities are introduced gradually.

Our Philadelphia clubs, being mostly neighborhood groups, vary in cultural and economic backgrounds. There are groups composed of all white, all negro, or people of mixed races; Italian, Jewish, and Polish persons; individuals of low, medium, and high income levels. There are also groups of intellectuals, business, and unemployed people. For the most part, however, the clubs cut across cultural and economic lines.

With all their varieties, there are some elements which are universally found in the club groups. Among these are contentment, pride in their club, concern and affection for one another, friendliness to visitors, lack of prej-

udice toward other members, gratitude, and a rich sense of humor.

Not all of the answers have been found, but discoveries are being made all along the way. From the vantage point of contact with all the groups, some tendencies have appeared which already seem to be the rule. It has been learned that:

Fear and shame of being old can change to pride through happy group experiences.

In a group, older people tend to be tolerant, cooperative, patient, mellow, appreciative, while many of their negative attitudes, practiced as individuals, tend to disappear.

The death rate among club members in their seventies and eighties seems unexpectedly low. They do seem to live longer with something pleasant to look forward to, with new friends and a new social life.

They undertake new pursuits of happiness with enthusiasm and satisfaction. Many of them are learning new attitudes as well as new hobbies which often offer a chance at last to realize some cherished dream.

A good example is a little woman 83 years old. At her first visit to a club she watched the other members dance. Then, as the strains of waltz music were played, she sat forward on her chair and looked eagerly at the leader. "Do you think I could learn to waltz?" she said. "I've always wanted to, but my family didn't approve of dancing. Would you teach me now?" Soon she became the club's most graceful dancer.

Another woman of foreign birth proudly boasts that she has had seventeen heads of children. One day she showed a daughter one of the articles she had made at her club. "Why, Mother," said her daughter, "we used to make things like this at school." "Don't I know it!" she countered. "You had your chance when I was cooking, sewing, and nursing you children. Now you have families of your own, it's my turn to have fun."

The opportunity for exchange of ideas on arts, crafts, music, and customs has opened many of the minds of our older people to new vistas of intercultural relationships.

The Philadelphia project is growing, and one way of measuring its growth and acceptance by the community in general is by the enrollment and attendance records.

In June, 1946, 426 individuals were enrolled.
In June, 1947, 1,167 individuals were enrolled.
In June, 1948, 2,059 individuals were enrolled.

There is now a monthly aggregate attendance of 4,813. Last year there was a total aggregate attendance of 16,842. This year (1947–1948) an aggregate attendance of 41,673 was recorded.

Much more is involved on the administrative level than on the organizational level of club groups. Administration requires writing interpretive literature; collecting materials for use by leaders, such as games, songs, dances, and plays; setting up referral machinery, such as a club directory; arranging conferences, institutes, and workshops; training leaders; working with press and radio; sharing the findings with other cities.

The real job has to be done, and is being done by the citizens—both lay and professional—of Philadelphia. Whoever they are and whatever their field, there is a place in this enterprise for them. Doctors, nurses, psychiatrists, medical social workers, case workers, group workers, recreation workers, lawyers, clergymen, parish workers, educators, students, artists, musicians, business men, veterans organizations, housewives, librarians, teachers, and writers—all are being called upon.

Summary

In Philadelphia recreation for older people is being sponsored and promoted on a city-wide basis by the Philadelphia Recreation Association. This social experiment has been in progress since June, 1946. There are now 43 clubs with a total enrollment of 2059 individuals, as of June, 1948, meeting at the rate of 5000 per month.

People from 65 years of age and older, of all cultural and economic levels, of all faiths and races, are gathering in neighborhoods on an average of once a week. They are enjoying arts, crafts, games, plays, music, dancing, parties, and picnics. They are making new friends, enjoying a new life.

The sponsors and hosts are urged to grant them freedom of decision and action, to offer continual and warm hospitality. The older

people are encouraged to choose and participate in their own program. For this reason the activities in each club group vary. They are recapturing some of their lost joy of living by learning new hobbies, acquiring new points of view, and making new friends.

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ARISTOTLE ON MENTAL AGING

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MORE THAN 2200 YEARS AGO ARISTOTLE STATED A THEORY OF MENTAL AGING. DIVIDING LIFE INTO THREE PERIODS, HE DESCRIBED YOUTH AND AGE AS GOING TO OPPOSITE EXTREMES IN THEIR BEHAVIOR, WHILE MIDDLE AGE EXHIBITED A RATIONAL MEAN BETWEEN THEM. IN THIS WAY HE ANALYZED FIFTEEN MAJOR ASPECTS OF BEHAVIOR.

IT would be hard to find a more concise, meaty, and penetrating account of the mental changes brought by age than the one that Aristotle wrote more than two thousand years ago. We might expect to find this in his *Psychology* or his *Ethics*, but in fact it is in the second book of his *Rhetoric* (1). It comes in almost incidentally while he is talking about the orator's need to adapt his arguments to the character of his hearers. This leads him to describe the differences of character between young men, elderly men, and men in the prime of life. He thinks both youth and age go to extremes and indeed to opposite extremes; he thinks the man in the prime of life is more likely to avoid the extremes and to approach the ideal of rational moderation, which is the core of Aristotle's ethics (see Books II, III, and IV of his *Nicomachean Ethics*).

Let me present the series of comparisons that he draws between youth and age.

Of the young he says, "All their mistakes are in the direction of doing things excessively and vehemently. They disobey Chilon's precept by overdoing everything." (His precept was "Nothing in excess.") "They love too much and hate too much, and the same with everything else. They think they know everything, and are always quite sure about it; this, in fact, is why they overdo everything." (All quotations from Aristotle are from *Selections*, pp. 323–327.)

Of elderly people, on the other hand, he says, "They have lived many years; they have often been taken in, and often made mistakes; and life on the whole is a bad business. The result is that they are sure about nothing, and *under-do* everything. They 'think' but they never 'know'; and because of their hesitation they always add a 'possibly' or a 'perhaps,' putting everything this way and nothing positively."

Of the young he says, "They look on the good side rather than the bad, not having yet witnessed many instances of wickedness. They trust others readily, because they have not yet often been cheated. They are sanguine; nature warms their blood as though with excess of wine; and besides that, they have as yet met with few disappointments. . . . They are easily cheated, owing to their sanguine disposition just mentioned." In contrast, he says of elderly people, "They are cynical; that is, they tend to put the worse construction on everything. Further, their

Dr. Chandler received his M.A. degree from Dartmouth College in 1909, another M.A. degree and his Ph.D. degree from Harvard in 1913. He was assistant in philosophy at Harvard from 1912 to 1913, instructor from 1913 to 1914, assistant professor of philosophy at Ohio State University from 1914 to 1925, professor since 1925, and visiting associate professor of philosophy, New York University, 1924–1925.

experience makes them distrustful and therefore suspicious of evil."

He says of the young, "They are fonder of their friends, intimates and companions than older men are, because they like spending their days in the company of others, and have not yet come to value their friends or anything else by their usefulness to themselves." Of elderly people he says that because of their cynicism and distrust "They neither love nor hate bitterly, but following the hint of Bias [one of the traditional Seven Wise Men] they love as though they will some day hate and hate as though they will some day love." Note that the Greeks had Machiavellian insights long before Machiavelli.

Of the young he says that "They have exalted notions [ambitions] because they have not yet been humbled by life or learnt its necessary limitations; moreover, their hopeful disposition makes them think themselves equal to great undertakings—and this means having exalted notions." Of elderly people he says, "They are small-minded, because they have been humbled by life; their desires are set upon nothing more exalted or extraordinary than what will help them keep alive."

He says of the young that "they love honor and victory more than they love money, which indeed they love very little, not having yet learnt what it means to be without it." . . . He says of elderly people "They are not generous, because money is one of the things they must have, and at the same time their experience has taught them how hard it is to get and how easy to lose."

He says of the young, "Their hot tempers and hopeful dispositions make them more courageous than older men are; the hot temper prevents fear, and the hopeful disposition creates confidence; we cannot feel fear so long as we are feeling angry, and any expectation of good makes us confident." Of elderly people he says, "They are cowardly, and are always anticipating danger; unlike that of the young, who are warm-blooded, their temperament is chilly; old age has paved the way for cowardice; fear is, in fact, a form of chill. . . . Their fits of anger are sudden but feeble."

He says of the young, "Their lives are spent not in memory but in expectation. Expectation refers to the future, memory to the past, and youth has a long future before it and a short past behind it: on the first day of one's life one has nothing at all to remember, and can only look forward." Aristotle rarely deigns to amuse us but his notion of the newborn infant contemplating its long future deserves an appreciative chuckle. Of the elderly he says, "They live by memory rather than by hope, for what is left to them of life is but little compared to the long past. This, again, is the cause of their loquacity; they are continually talking of the past, because they enjoy remembering it."

He says of the young, "They are shy [modest], accepting the rules of society in which they have been trained, and not yet believing in any other standard of honor." He says of elderly people, "They are not shy, but shameless rather; caring less for what is noble than for what is useful, they feel contempt for what people may think of them." Yet many young people defy Mrs. Grundy, and many old people anxiously ask, "What will people think?" Is there a defect in Aristotle's observation, or is there a cultural difference in this respect between ancient Athens and modern America?

Of the young he says, "They would always rather do noble deeds than useful ones; their lives are regulated more by moral feeling than by reasoning; and whereas reasoning leads us to choose what is useful, moral goodness leads us to choose what is noble." Regarding elderly people he says, "They love life; and all the more when their last day has come, because the object of all desire is something we have not got, and also because we desire

most strongly that which we need most urgently. They are too fond of themselves; this is one form their small-mindedness takes. Because of this, they guide their lives too much by considerations of what is useful and too little by what is noble—for the useful is what is good for oneself, and the noble is what is good absolutely. . . . They guide their lives more by reasoning than by moral feeling; reasoning being directed to utility and moral feeling to moral goodness."

Of the young he says, "They have strong passions, and tend to gratify them indiscriminately. Of the bodily desires it is the *sexual* by which they are most swayed and in which they show absence of self-control. They are changeable and fickle in their desires, which are violent while they last, but quickly over; their impulses are keen but not deep-rooted, and are like sick peoples' attacks of hunger and thirst." Of the old he says, "Their sensual passions have either altogether gone or have lost their vigor: consequently they do not feel their passions much, and their actions are inspired less by what they do feel than by love of gain."

He says of the young, "If they do wrong to others, it is because they mean to insult them, not to do them actual harm." Of elderly people he says, "If they wrong others, they mean to injure them, not to insult them." This difference seems to be linked with the concern of the young for honor, which leads them to attack the honor of others when angry with them; the elderly are more practical and concerned with money.

Of the young he says, "They are ready to pity others, because they think every one an honest man, or anyhow better than he is; they judge their neighbor by their own harmless natures, and so cannot think he deserves to be treated in that way." Of the elderly he says, "Old men feel pity, as well as young men, but not for the same reason. Young men feel it out of kindness; old men out of weakness, imagining that anything that befalls any one else might easily happen to them, which, as we saw, is a thought that excites pity." (He refers to *Rhetoric,* Book ii, Chapter 8.)

Here is the final contrast that he draws. The young "are fond of fun and therefore witty, wit being well-bred insolence." The elderly "are querulous, and not disposed to jesting or laughter—the love of laughter being the very opposite of querulousness." Aristotle's idea of wit seems to be what we might call "tactful kidding." Also, he seems to connect the querulousness of age with its weakness and inclination to pity.

Let me pass on to his description of men in their prime, because it completes his depiction of the ages of man.

He says, "As for men in their prime, clearly we shall find that they have a character between that of the young and that of the old, free from the extremes of either. They have neither that excess of confidence which amounts to rashness, nor too much timidity, but the right amounts of each. They neither trust everybody nor distrust everybody, but judge people correctly. Their lives will be guided not by the sole consideration either of what is noble or of what is useful, but by *both;* neither by parsimony nor by prodigality, but by what is fit and proper. So, too, in regard to anger and desire; they will be brave as well as temperate, and temperate as well as brave; these virtues are divided between the young and the old; the young are brave but intemperate; the old, temperate but cowardly. To put it generally, all the valuable qualities that youth and age divide between them are united in the prime of life, while all their excesses or defects are replaced by moderation and fitness."

It is not clear whether Aristotle is thinking of three stages in life, each changing abruptly into the next, or of a continuous transformation. In any case he thinks that we begin with one set of extremes, pass through a period in which we do all things in moderation, and end with the opposite set of extremes. Such a view seems too favorable to middle life and too unfavorable to youth and age. Few men in middle life are moderate in all things; few youths or old men are extreme in all things. Each human life presents a variegated pattern at all times—usually some features are excessive, others deficient, and

others moderate. In each human life different traits change at different rates. Aristotle's account is rich in observation, yet oversimplified.

It is instructive to compare Aristotle's description of old age with the views of recent psychologists and psychiatrists. Cavan (2) tells us that there is general agreement that the following traits and trends are frequently found in later years:

Worry over finances, attendant upon threatened retirement. (Aristotle said that the aged love money.)
Worry over health.
Feeling unwanted, isolated, lonely.
Feeling suspicious. (Aristotle noted this.)
Narrowing of interests, leading to introspection, increased interest in bodily sensations and physical pleasures. (Aristotle said that the aged are too fond of themselves and more concerned with utility than with honor.)
Loss of memory, especially for recent events and in the field of spontaneous recall.
Mental rigidity.
Overtalkativeness, especially of the past. (Aristotle noted this.)
Hoarding, often of trivial things.
Loss of interest in activity and increased interest in quiescence.
Feeling of inadequacy, leading to feelings of insecurity and anxiety, feeling of guilt, irritability. (Of these, Aristotle noted only "querulousness" and lack of confidence in the future.)
Reduction of sexual activity but increased sexual interest, especially in the male; regression to earlier levels of expression. (Aristotle noted the decline or disappearance of sexual passions, but instead of noting an increased interest he says that the aged "do not feel their passions much.")
Untidiness, uncleanliness.
Conservatism (one author dissents on the basis of opinion poll material).
Inability to adjust to changed conditions.
Decreased social contacts and participation.

Lawton lists eighteen forms of maladjustment that are characteristic of old age (3). One of these is "preference for safety as over against zestful but uncertain adventure." (Aristotle bluntly says that the aged are cowardly.) Lawton also speaks of "the adoption of the role of infallibility and prophecy." This is the opposite of the tendency noted by Aristotle to preface every statement with "possibly" or "perhaps." Perhaps both Aristotle and Lawton are partly right. Are not the aged prone to be dogmatic about glittering generalities in religion, ethics, and politics, but prone to be uncertain in opinion and hesitant in action when it comes to concrete situations that are unfamiliar and difficult?

Evidently the modern investigators have noted some important trends not mentioned by Aristotle; on the other hand, he mentions some trends not found in the modern lists. As we deal with older people, or as we grow older ourselves, should we not be on the lookout for the trends that Aristotle describes?

Summary

Aristotle asserts fifteen principal contrasts between youth and age, which are indicated by the following pairs of phrases: overdoing, underdoing; sureness of opinion, uncertainty of opinion; looking on the good side, looking on the bad side; too trusting, too suspicious; loving and hating strongly, loving and hating weakly; ambitiousness, unambitiousness; loving honor, loving money; braveness, cowardliness; expectation, memory; modesty, shamelessness; aiming at nobility, aiming at utility; having strong passions, especially the sexual, having weak passions; insulting others, harming others; pity because of kind feeling, pity because of insecurity; fun and wit, querulousness. He asserts that men in the prime of life avoid these extremes, displaying moderation and fitness in their behavior. His observations partly anticipate and partly supplement those of modern psychologists.

This article is based on a broadcast given in the winter of 1947–1948 over station WOSU of Ohio State University in a series on Philosophy for Later Years.

References

1. Aristotle: *Selections*, edited by W. D. Ross. Charles Scribner's Sons, New York, 1927, pages 323–327. In other translations the passage may be found in Book II, chapters xii, xiii, and xiv of the *Rhetoric*.
2. Cavan, Ruth Schonle: Index of Senility in *Social Adjustment in Old Age*. Social Science Research Council, New York, 1946.
3. Lawton, George: Personality Adjustments in Old Age, in *Social Adjustment in Old Age*. Social Science Research Council, New York, 1946.

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CURRENT COMMENT

Courses of Instruction in Maturity and Old Age

Replies to a stimulating questionnaire sent to 71 medical schools, 76 psychology departments, and 62 colleges of education formed the basis of a report of the Committee on Instruction for Maturity and Old Age, Division of Maturity and Old Age, American Psychological Association.

Of the 52 medical schools responding, 5 offered specific courses, 3 are definitely planning courses, 6 are tentatively planning courses, and 28 integrate the instruction into other courses.

Of the 60 psychology departments replying, 3 offer specific courses, 4 definitely plan courses, 5 tentatively plan courses, and 24 integrate the instruction into other courses.

Of the 32 colleges of education, 2 offer specific courses, none are planning courses, and 15 integrate the instruction into other courses.

"It is noteworthy that so few centers are specifically offering instruction on the ageing process—courses designed for professional workers and older clients, or designed to stimulate research on the problems of mature and older people. The medical sciences have conducted the most extensive researches, yet offer relatively little separate instruction in the area. To judge from letters and footnotes, quite a number of medical schools are aware of greater responsibilities for guidance of older people devolving upon the physician. Most schools feel that such instruction, however, is most conveniently integrated into courses already in the curriculum.

"Psychology departments likewise expressed an interest in the general area, but frequently remarked that curriculum expansion was out of the question for the time being. . . . Colleges of Education, in general, are doing little in this area apart from an occasional course in adult education."

This interesting survey focuses attention upon the existing courses of instruction offered in the field of gerontology and the necessity for further expansion.

Laboratory for Research at Moosehaven

At a meeting in Jacksonville, Florida, February 28, 1948, the National Advisory Council for Research at Moosehaven on the Processes of Aging recommended that "the main line of attack should be the investigation of the physical, nutritional, social, educational

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The hieroglyphics, "The Beginning of the Book for Transforming an Old Man into a Youth," at the top of this editorial page, are from the Edwin Smith Surgical Papyrus, translated by Professor John Breasted, University of Chicago Press.

and emotional factors contributing to the improvement and maintenance of mental health in the aging population."

The Council suggested that a Research Director be appointed as soon as possible and given an adequate staff, a staff which "must have the same freedom and responsibility as similar individuals in our leading universities and research institutions."

The hope was expressed that members of the Moose in their various localities would personally aid, by serving as subjects for checks and controls on younger age groups, the work done by competent institutions or individuals in their own cities or states.

National Conference of Social Work

One of the twelve sections of the National Conference of Social Work held in Atlantic City April 17–23, 1948, was devoted to the aged. Lucia J. Bing, Executive Secretary, Committee on the Aged and Chronically Ill, Welfare Federation of Cleveland, was Chairman of the section.

The program, including three joint sessions with other sections, was as follows:

Mental Hygiene for the Aged.

1. Mental Health Needs of the Aged. —Jack Weinberg, Psychiatrist, Michael Reese Hospital, Chicago.
2. Recreation for the Aged. — Oskar Schulze, former Director of Recreational Services for Older People, Benjamin Rose Institute, Cleveland.

The Economic Implications of an Aging Population.

1. Social Insurance and Public Assistance in the United States.—Eveline Burns, Social Economist and Member of Faculty, New York School of Social Work, Columbia University.
2. Employment Problems of Older Persons.—Joseph W. Willard, Officer in Charge, Research Division, National Department of Health and Welfare, Ottawa, Canada.

Planning for the Chronically Ill.

1. Panorama of National Planning.—Milton Terris, Secretary, Joint Committee on Chronic Disease, the American Hospital Association, American Medical Association, American Public Health Association, and American Public Welfare Association.
2. A State Sets Its Stage for Action.—John Bourke, Executive Director, New York State Joint Hospital and Planning Commission, Albany.
3. The Community as a Laboratory for Service.—Edna Nicholson, Director, the Central Service for the Chronically Ill, Chicago.

Interesting Social Experiments in Care of the Aged.

1. Advances in Group Living Arrangements in the United States.—Ruth Hill, Director, Old Age Project, Family Service Society, Hartford, Connecticut.
2. Social Experiments in Living Arrangements in Europe.—Richard Clements, Secretary, London Council of Social Service, London.

The Problems of an Aging Population—from a Biological, Clinical, and Social Point of View.

1. The Challenge of Longevity.—Edward J. Stieglitz, Washington, D.C.
2. Medical Social Work for the Aged.—Minna Field, Director of Social Service, Montefiore Hospital, New York City.
3. Recreation Services for the Aged.—Harry A. Levine, Administrator, Special Services to the Aged, Department of Welfare, New York City.

This is an expanded program on the socio-economic problems of the aging.

Five Year Program in Pennsylvania

Nine points are emphasized in a preliminary report of the Five Year Program Committee of the Division for the Aged, Health and Welfare Council, Inc., Delaware, Mont-

gomery, and Philadelphia Counties.

The need for an educational program for later maturity, publicity and public relations, housing and living arrangements, non-profit homes for the aged, employment, leisure time activities, personal services, health, and legislation and public programs is outlined. Attention is called to the need for strengthening or expanding present resources and the creation of new services.

This careful report concludes with the statement "The older citizens of our community are for the most part an inarticulate group and only the impact of their numbers, not their demands, has caused a searchlight to be cast upon them. Their unmet needs are many and an adequate program for them demands the combined efforts of conscientious and enthusiastic citizens, young and old."

Progress in Recreational Facilities

Philadelphia. — Forty-one "Golden Age Clubs" are now active in Philadelphia. All-day centers, hobby shows, vacation opportunities, and visits to the homebound are part of the Five Year Program of the Division for the Aged.

New York.—Sponsored by social agencies in the five boroughs, the number of recreation centers will total thirty by the fall of this year. The centers hold meetings, parties, discussion groups, dancing groups, tours, and outings and provide facilities and materials for hobbyists.

St. Louis.—As a result of work at three Community Chest social agencies, there are now three clubs for older people and three additional branches are being opened. Members participate in group games, dances, meetings, parties, community drives, arts and crafts projects, and picnics.

Elders in the News

Of the 52 known survivors of the Union Army, the oldest is Albert Hard, Rochester, New York, 106, and the youngest is James Crugom of Chicago, 97. Missouri and California, with six in each state, have the largest number of living veterans. William H. Osborn, Joplin, Missouri, 105, held a one-man encampment of the Missouri Department, Grand Army of the Republic, in May and re-elected himself commander.

* * *

According to Ripley, Anastacio Gayten, San Antonio, Texas, is still active as a mason at the age of 101. He lost both thumbs in his youth.

* * *

Miss Florence Dolph, Scranton, Pennsylvania, celebrated her 101st birthday in May with her usual slide down the banister. The *Times* of London, intrigued by the report, wrote, "We have no vestige of right to assume she spent the rest of the day in a rocking chair; she is far more likely to have been crouched over the controls of a helicopter, and if she was we ought to have been told about it . . ."

* * *

How to live to be 100: "When I works, I works hard. When I sits, I just sits relaxed. When I start worrying, I just fall asleep," says Uncle Walter Morrison, who says he was born in slavery in Virginia 100 years ago.

* * *

Mrs. Moses Fraley, St. Louis, celebrated her 100th birthday in April. Five generations of her family attended the party.

* * *

A birthday party was held in May for James M. Alexander, 97, at his old post with the Missouri Pacific Lines.

* * *

All of Brushton, New York, celebrated the wedding of Mrs. Eliza Murray, 90, and 37-year-old Clarence McGee. Privately Mrs. McGee admits she must be more than 90, but for the marriage license record she made it 80.

* * *

"Scooter-biking is a cinch. Only way to see the country," said 82-year-old Charles A. Lasure after a 1000 mile ride from Ardmore,

Oklahoma to Cincinnati, Ohio. The trip home? By scooter-bike, of course.

* * *

At 81, Patrick L. White, St. Louis, still uses the armchair, presented to him three years ago for his use after retirement from business, only after working hours. A trucker, White loves his work and retirement is still a matter to be considered in the far distant future.

* * *

England's beloved Queen Mary was 81 in May. Guns boomed out royal salutes in her honor.

* * *

Twin sisters, Mrs. Albert E. Dillon and Mrs. Elmer Stevens, St. Louis, marked their 80th birthday in April.

* * *

The court has ruled that Mrs. Florence R. Vollrath, 75, of Philadelphia, would have no more children, although according to common law the possibility of bearing children exists as long as life. The distribution of a trust fund of $100,000, to be divided among Mrs. Vollrath's children when the youngest became 21, was the occasion of the ruling. The youngest of her four children is 42.

* * *

A grandmother and her grandson, 19, were participants in a double wedding in New Hampshire in July. Mrs. Lillian H. Brown, 73, married 73-year-old Charles H. Colby.

* * *

A 3-room cabin was built in 60 days by a 60-year-old woman. According to Ripley, Edith M. Symington, Big Bear Lake, California, sawed all the materials and drove every nail. And yet the United Nations notified its employees in June that all over 60 years old would be dismissed except in a few special cases.

* * *

Malvina Hoffman, outstanding American sculptor, sees no reason she should taper off her career just because she is 60 years of age. And she still likes to go to night school. "There is nothing like putting yourself in competition with young people to make you forget your years," she says.

News and Notes

Spain.—The Spanish Gerontological Society has been organized under the direction of Professor Dr. M. Beltrán Báguena, Faculty of Medicine, Valencia, as President, Dr. F. Grande Cobian, Madrid, as Vice-president, Dr. F. Vega Diaz, Madrid, as Secretary, and Dr. Alvarez Sala, Madrid, as Treasurer.

Research Grants.—A grant of $30,000, payable over three years, was made recently by the Carnegie Corporation of New York to the University of Chicago for a study of psychologic and sociologic problems of later maturity. The grant will enable the University to continue exploratory studies in this field under the direction of Professors Ernest W. Burgess, Robert J. Havighurst, and Herbert Goldhamer.

The American Foundation for High Blood Pressure announced through the Chairman of its Medical Advisory Council, Dr. Irvine H. Page, that applications for grants for research in hypertension and arteriosclerosis may be made to the Chairman of the Allocations Committee, Dr. Harry Goldblatt, Cedars of Lebanon Hospital, Los Angeles. Other members of the committee are Dr. Thomas Addis, San Francisco, and Dr. William Dock, Brooklyn.

Hobby Show.—The Second Annual Hobby Show for Older People was held June 9 to 13 at the American Museum of Natural History under the sponsorship of the Welfare Council of New York City.

Meetings.—The annual scientific meeting of the American Society for the Study of Arteriosclerosis will be held on October 31 and November 1, 1948, at the Hotel Knickerbocker, Chicago, Illinois. The names of the newly elected officers of the Society are: Dr. William B. Kountz, St. Louis, President; Dr. Irvine H. Page, Cleveland, Vice-president;

Dr. O. J. Pollak, Quincy, Massachusetts, Secretary-treasurer.

The Continuing Committee of the National Conference of Protestant Homes for the Aged has recommended that the Executive Committee arrange to include a special session dealing with services to the aged at the National Conference of Social Work in Cleveland in 1949.

Dr. Karl Stern will be chairman of the Preparatory Commission on Mental Problems of Later Life at the International Conference on Mental Health in London in September, 1948.

A meeting of the Medical Society for the Care of the Elderly was held February 13 at the Middlesex County Hospital where Dr. Marjory Warren gave a clinical demonstration, showing a number of hemiplegic patients in various stages of recovery.

Trois Journées pour l'Etude Scientifique du Vieillissement de la Population were held in Paris from April 22 to 24. The purpose was to prepare a general work in French on the various aspects (biologic, psychologic, demographic, and economic) of the aging problem. Dr. Bourlière was in charge of the biologic section, and the British Society for Research on Ageing was represented by Dr. Korenchevsky.

The Society of Medicine of Vittel held a Congress of Longevity at Vittel (Vosges), France, June 19 and 20, under the presidency of Pierre Joannon, Professor of Hygiene and Preventive Medicine of the Faculty of Medicine of Paris. The principal subjects studied pertained to the hygiene of adulthood, the physiopathology of senescence, the fight against the illnesses of old age by means of preventive medicine, and, in a general manner, the application of sanitary and social measures for the prolongation of human life. The Congress was divided into four sections, 1) Physiology, 2) Clinical and Biologic Medicine, 3) Hygiene and Therapy, and 4) Statistics and Sociology.

At a meeting of the American Psychiatric Association in Washington, May 19, 1948, Drs. F. J. Kallmann and G. Sander presented a paper, Twin Studies on Biological, Social, and Psychiatric Problems of Senescence.

In addition to editorial material placed in this section the JOURNAL OF GERONTOLOGY will accept notices of positions open.

NOTICE

The first annual scientific meeting of the Gerontological Society will be held at the Hotel Commodore on Saturday and Sunday, January 8 and 9, 1949. A program of the meeting and abstracts of papers to be presented will be published in the next issue of the Journal.

GERONTOLOGIC reviews

THE ANTIRETICULAR CYTOTOXIC SERUM AND AGING

Since the publication in the United States in December, 1943, of a survey of the Russian experience with the antireticular cytotoxic serum (ACS) of Professor Alexander A. Bogomolets (Bogomolets, ACS As a Means of Pathogenetic Therapy, American Review of Soviet Medicine, *1:* 101–112, 1943) there has been extensive albeit sporadic interest in the subject. The claims of many Russian clinicians of the beneficial effects of the serum in such motley and apparently dissimilar conditions as carcinoma, indolent infections, ununited fractures, and schizophrenia, among many others, have stimulated some experimental work in this country and in England in an attempt to determine the validity of these claims. There has been a popular impression that the antireticular cytotoxic serum was introduced as an anti-old age elixir (Bogomolets, The Prolongation of Life, Duel, Sloan and Pearce, Inc., New York, 1946). The claim that the serum can at present actually prolong human life has not been advanced by other workers in Russia or in this country.

Bogomolets has called the use of his serum a pathogenetic therapy in accord with the methods first attempted by Metchnikoff and Bordet. Metchnikoff derived the basic concept of a pathogenetic therapy from the fact that cytotoxins, substances which in moderate or high dosage are toxic to cells and organs, frequently had a stimulating effect on the same cells and organs if given in very small amounts. Bogomolets prepared his antireticular cytotoxic serum by taking an organ or particular type of tissue from an animal of one species, a guinea pig for instance, and preparing a saline suspension which he then injected into an animal of another species, such as a dog. After sufficient injections into the dog, a serum prepared from the dog's blood produced toxic symptoms when injected in large doses into guinea pigs, whereas small doses acted as a stimulant; such a serum was called ACS (antireticular cytotoxic serum).

In the years before he developed his serum, Bogomolets studied extensively the gross and microscopic anatomy and morphology of the connective tissue and the reticulo-endothelial system which he later named the physiologic system of the connective tissue. He said of the connective tissue "To a great extent it determines the body's reactivity both qualitatively and quantitatively, therefore, determining its constitution. The age and health of the body are determined largely by the age changes and physiologic condition of its connective tissue."

In designating the reticulo-endothelial system "the physiological system of the connective tissue," Bogomolets abandoned the limited mechanistic concept of the connective tissue as primarily a system for support of organs and transfer of metabolites between the blood stream and the viscera and attributed to it the known activities of the reticulo-endothelial system. He grouped these physiologic functions under five headings: (1) trophic functions which are concerned primarily with the transfer of metabolites and

the removal of waste products of cellular activity, (2) the plastic function evidenced in healing and reorganization of damaged tissues, (3) the protective functions involved in phagocytosis, (4) immunity reactions and reactions to new growths, the autoregulative function seen in such activities as hemolysis of red cells and metabolism of iron, and (5) the purely mechanical function of support which from the physiologic point of view is the least important.

Some of the critical comment on the use of the Bogomolets serum has stressed the fact that spleen and bone marrow, the tissues from which the suspension for injection into the animal producing the serum is made, are complex tissues. These tissues contain many components other than those of connective tissue and reticulo-endothelial system, and therefore, any serum derived from such preparations must contain cytotoxins or antibodies to these other tissues as well. Certainly the identity of the active component or components of the antireticular cytotoxic serum are not conclusively known, although Frieden, Pomerat, and Anigstein identified an inhibitory fraction of the serum associated with a globulin fraction (Science, *102:* 354, 1945).

The chief hope of Bogomolets and his coworkers in devising the antireticular cytotoxic serum was to cause stimulation of the physiologic system of the connective tissue by giving small, non-toxic, non-depressing doses of ACS. They prepared antiserum by injecting preparations made from human spleen and bone marrow into the horse; then small doses of the serum from the immunized horse were then injected into patients. The technique of preparation and titration of the serum by the complement fixation reaction has been reported in some detail by Marchuk, who worked in close collaboration with Bogomolets (Marchuk, Method of Preparing and Preserving ACS, American Review of Soviet Medicine, *1:* 113–123, 1943).

The chief emphasis of the Russian workers after the successful preparation and titration of the serum was on its possible application in cancer. They reported that small, stimulating doses of the serum inhibited the growth of transplants in the host animal, that it markedly inhibited the process of metastasis or spread of the tumor cells to new sites by way of the blood stream or lymphatic system, and that it increased the destruction of cancer cells by lysis and the growth around and into the tumor of connective tissue. Larger or depressing doses of the serum abetted the growth and metastasis of tumors.

By the time Russia entered the war many clinicians in the U.S.S.R. were studying the effects of the serum in various clinical conditions. Because of their favorable reports, large amounts of the serum were released for use in military and civilian medicine during the war. In July, 1942, a conference on the serum was held at Ufa in the Ukraine, (American Review of Soviet Medicine, *1:* 101–112 1943). Here many reports of clinical results were given. Particularly important at that time seemed the reports of the efficacy of the serum in hastening cure of osteomyelitis, frostbite, many types of indolent war wounds, slowly healing or ununited fractures, and even some cases of gangrene. Reports were also made of good results with the use of the serum in such unrelated conditions as lung abscess, puerperal sepsis, scarlet fever, typhus, hypertension, acute rheumatism, and inflammatory and degenerative diseases of the eye. The beneficial effects in these conditions were all attributed to stimulation of one or more aspects of the physiologic system of the connective tissue. No controlled animal experimentation was offered in substantiation of the claims of clinical benefit.

Following these reports and the publication in English of the method of preparation and titration of the serum, some carefully controlled work was done in the United States and in England to elucidate the mechanism of action, if any, of the serum and to investigate the claims of clinical benefit put forth by the Russians.

The most fundamental work done in this country has come from the laboratory of C. M. Pomerat, who with his coworkers has studied the effects of the serum on tissue culture preparations (Pomerat and Anig-

stein, Texas Reports on Biology & Medicine, *3:* 122–141, 1945, Texas Reports on Biology and Medicine *3:* 404–411, 1945, and Science, *100:* 456, 1944). They noted definite inhibition of outgrowth in explants of embryo chick, rat, and guinea pig spleen cultured in immune serum of a concentration up to 1 to 20. In another experiment no effect was noted on outgrowths from chick heart specimens when a heterologous serum, i.e., one derived from the injection of heart tissue preparations from animals other than the chicken, was used. When a serum derived from injection of chicken heart into another animal (a homologous serum) was used, some evidence of stimulation of the chick heart outgrowths was noted. This work tends to support the fundamental concept of the mechanism of a cytotoxic serum.

Stimulated by the Russian claims of cure of unspecified types of rheumatism, several workers investigated the use of the serum in various arthritides. The first report was that of Francis Bach (Annals of Rheumatic Disease, *4:* 62–64, 1945), who treated 48 patients with rheumatoid arthritis, rheumatic fever, gonorrheal arthritis, osteoarthritis and nonarticular rheumatism with the serum. Fourteen patients reported subjective improvement, but many relapses occurred in a short time. The results of this study were definitely inconclusive. In this country, Rogoff, Freyburg, Powell, and Rice induced polyarthritis in rats with a pleuropneumonia-like organism. The development of the polyarthritis was not influenced in time of onset or in severity by the administration of antireticular cytotoxic serum given either therapeutically or prophylactically (American Journal of Medical Sciences, *214:* 395–400, 1947).

Possibly the most carefully controlled work on the antireticular cytotoxic serum done in this country was that of Reuben Straus and his coworkers who investigated the effects of the serum on the healing of experimentally produced fractures in rabbits (Journal of Immunology, *54:* 151–177, 1946). They found that healing of such fractures was definitely aided by small stimulating doses of antireticular cytotoxic serum whereas inhibition of healing was produced with large or depressing doses.

From this survey of the claims made for the antireticular cytotoxic serum and of experimental and clinical work, it would appear that much more carefully controlled experiments must be completed before any definitive evaluation of the serum can be made. Further work is being carried on in the U.S.S.R., but the interest in the work is much less in the United States.

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BOOKS

THE RESPONSIBILITY OF THE CHURCHES TO THE ELDERLY

THE PROTESTANT CHURCHES AND THE AGED IN NEW YORK CITY, The Pathfinding Service for the Churches, 105 East 22 Street, New York 10, N.Y. 1948, 25c, 22 pages (mimeographed).

Although many homes for the aged are conducted under sectarian auspices and provide places for worship within their walls, the churches themselves have done very little to adapt their communal programs to the changing age make-up of the population. The recent publication of the Pathfinding Service is an excellent contribution to this problem, and although written from the Protestant viewpoint, its suggestions are couched in such general terms that they may be read with profit by churchmen of all creeds, as well as by physicians and social welfare workers.

Of particular interest is the effort made by the writers of the report to clear up three popular misconceptions concerning the churches and the older members of the community. That with increasing age people turn more readily to religion, is simply not borne out by the available facts. For a variety of reasons of both physical and financial nature, age is thought more likely to decrease church attendance and participation than to increase it. That old people dominate the life of the Protestant churches, is likewise inaccurate, since where older individuals are found in positions of leadership, these are matters of habits or loyalties retained from younger days rather than situations where age is the determining factor. That the older people in the churches represent the group most resistant to change is another generalization that cannot be proved, since the religious concerns and habits of persons over sixty-five vary widely with each individual and depend largely on the influences of younger days.

The special concern of the church for the aged is particularly well stated: "Where there is a situation that can be described as a waste of personality, where the human spirit is permitted to deteriorate through inertia and neglect instead of moving forward to the rewarding maturity that we understand to be the divine purpose, the responsibility of the church is clear."

The outlined program is eminently practical and is based on what the churches can do for the aged and what the aged can do for the churches. Both the membership and the ministers require education. Existing facilities, often idle during the week, must be fully utilized. Above all segregation of the older members of the congregation must be avoided. Great benefits in turn will accrue to the congregation that learns to utilize the skills and talents of their older members as well as their leisure time since many church activities depend wholly on the efforts of volunteer workers.

The report concludes by pointing out that among the older people are many who "have had successful and constructive lives, who have surmounted many personal problems and helped others over rocky spots, and who have the wisdom and tolerance and Christian spirit that comes only with years of experience. These are perhaps the most important resources the churches have among this group, and they must not be neglected through the failure of the churches to meet them with a program that includes them, respects them, and recognizes what they can give."

F. D. ZEMAN

THE NEEDS OF THE NEGRO AGED

A STUDY OF THE NEEDS OF THE NEGRO AGED IN NEW YORK CITY, Helen Burke. Federation of Protestant Welfare Agencies, New York, 1946, 42 pages.

The large Negro population of New York City presents many complex health and social welfare problems, to the solution of which public and private agencies are devoting more and more attention. For the first time the needs of the Negro aged have been subjected to analysis in a well planned study under the direction of a carefully selected inter-racial committee and sponsored by the Federation of Protestant Welfare Agencies.

An unusual feature is the "Survey of Aged Negroes in New York City" by Mr. Elmo Roper, in which the technique of the public opinion poll is used to throw light on social questions. By direct questioning of a cross section of the group under scrutiny it was possible to ascertain the financial and social status, the plans that had been made for old age, and to cover a variety of other significant points. The results of the investigation are vividly illustrated by pictograph charts.

In summary the conclusions of the whole study are as follows: The economic level of the aged Negro is low and below the average of the nation as a whole. The majority of aged Negroes are single, or widowed, and live alone. Elderly Negroes seem to wish to continue living in their own homes as long as it is possible for them to do so. This group encounters difficulty in finding adequate housing, suitable to their needs and within their financial limits. As long as they are able to continue as they are, they do not wish to entertain the idea of entering a home for the aged. Considerable prejudice against homes for the aged seems to be based on lack of knowledge of this type of care. The infirm group has difficulty in working out plans for care within their own homes because of lack of housekeeping and nursing services, and encounters further obstacles in working out plans for care in an institution, because of lack of facilities.

There are only three private homes for aged Negroes in New York City with a total capacity of sixty beds. In the two city institutions for the aged, with a combined capacity of 2952 beds, only 105 Negroes over 55 years old were counted. Medical care is one of the urgent needs of aged Negroes and while some facilities exist for this type of care, many people are physically unable to use them. Lack of knowledge of existing community resources is common among older Negroes. The church is the focal point of outside activities of the elderly Negro.

The recommendations of the Committee follow logically from their findings and include adaptation of existing facilities to the care of the aged Negro, development of housekeeper services and visiting nursing care for older people, provision for more adequate facilities by social agencies for the Negro aged through development of foster home care, small boarding home units, and cooperative apartments under some supervision. Of obvious need is the wider interpretation by health and welfare agencies to the Negro of the services available, the development of additional recreational facilities adapted to needs of older people, and a review of church programs to determine whether the churches can offer further opportunities to the aged Negro.

The content of this report will hardly surprise the experienced worker since the differences between white and Negro aged are largely quantitative, but a widely useful purpose has been served by the dispassionate recital of unpleasant facts buttressed by figures and charts. That the coming years will see the lifting of some of the burdens of the Negro and the realization of the committee's plans must be the sincere wish of all true friends of mankind.

F. D. ZEMAN

BOOKS RECEIVED

Books received since March 1, 1948, are acknowledged in the following list. Insofar as space and time permit, some will be selected for review in a later issue, but it is unlikely that all will be reviewed.

Classified Bibliography on Geriatrics and the Care of the Aged, by John J. Griffin, 57 School Street, Somerville 43, Massachusetts, 1948, $2.10 postpaid, $1.85 prepaid, 20 per cent discount on 10 or more, 80 pages.

Introduction to Clinical Psychology, edited by L. A. Pennington and Irwin A. Berg, Ronald Press Co., New York, 1948, $5.00, 595 pages (Chapter 11 "Psychological Trends and Problems in Later Maturity," by Raymond G. Kuhlen, pages 218-248).

Live Long and Like It, by C. Ward Crampton, Public Affairs Pamphlet No. 139, Public Affairs Committee, Inc., New York, 1948, 20c, 32 pages.

Old Age and Survivors Insurance. A report to the Senate Committee on Finance from the Advisory Council on Social Security, Document No. 149, U.S. Government Printing Office, Washington, 1948, 68 pages.

Protestant Churches and the Aged in New York City, published by the Pathfinding Service for the Churches, New York, 1948, 25c, 22 pages (mimeographed). (Reviewed in this issue, page 233.)

Recreation Facilities for Older People, prepared for Conference Group on Welfare of the Aged by Information Bureau, Welfare Council of New York City, 1948, single copies 10c, 15 copies $1.00, 50 copies $3.00, 14 pages (mimeographed).

Social Medicine of Old Age. Report of an Inquiry in Wolverhampton, by J. H. Sheldon, published for the trustees of the Nuffield Foundation by Geoffrey Cumberlege, Oxford University Press, London, 1948, 5s net, 239 pages (paper bound).

Study of the Needs of the Negro Aged in New York City, by Helen Burke, Federation of Protestant Welfare Agencies, New York, 1946, copies to be lent but not sold, 42 pages. (Reviewed in this issue, page 234.)

INDEX TO CURRENT PERIODICAL LITERATURE

It is difficult to cover all journals and list all papers concerned with aging and the aged. Authors and publishers are requested to call attention to publications or send reprints. —*Editor.*

ABESHOUSE, BENJAMIN—Louis H. Tankin, and Samuel Lerman. Dissecting Aneurysm of the Aorta: Report of a Case with Anuria, and Prolongation of Life by Peritoneal Lavage. *Urologic and Cutaneous Review, 52:* 196–203, 1948.

ACKERMANN, PHILIP—(See Kountz, W. B., and Lilli Hofstatter.)

ADRENALS—Comportamento dello Stroma della Ghiandola Surrenale nei Vari Periodi della Vita nell 'Uomo (Behavior of the Stroma of the Adrenals in the Various Periods of Life in Man). A. Pasqualino. *Archivo italiano di anatomia e di embriologia, 46:* 288–329, 1941.

AFFLECK, JAMES WHIGHAM—Administrative and Clinical Problems of Chronic Sickness and the Diseases of Later Life. *Glasgow Medical Journal, 29:* 99–115, 1948.

AFFLECK, JAMES W.—Psychiatric Disorders Among the Chronic Sick in Hospital. *Journal of Mental Science, 44:* 33–45, 1948.

AGE—Radiological Evidence of Age. B. J. Leggett. *British Medical Journal, 1:* 368, 1948.

AGED, CARE OF—Medical Care of the Aged in Shawnee County, Kansas. D. D. Carr. *Quarterly Bulletin of the Indiana University Medical Center, 9:* 14–17, Oct., 1947.

Modern Methods in the Care of the Aged. L. Z. Cosin. *Journal of the Royal Institute of Public Health and Hygiene, 11:* 122–135, 1948.

AGERSBORG, H. P. K.—Gerontology and Its Application to Medicine and Sociology. Abstract, *Anatomical Record, 99:* 579–580, 1947.

AGING—Evidence for Ageing as a Consequence of Growth Cessation. Albert I. Lansing. *Proceedings of the National Academy of Science, 34:* 304–310, 1948. Abstract, *Anatomical Record, 99:* 579, 1948.

Variations in Sensitivity as Related to Age of the Parents. Jeanne Lévy and Roger Meyer. *Comptes rendus des séances de la société de biologie, 140:* 447–448, 1946.

AHLTORP, GIDEON — Seniets Gynekologi (The Gynaecology of Old Age). *Nordisk Medicin, 37:* 12–15, 1948.

ALCOHOLISM—Alcoholism in the Older Age Groups. Robert V. Seliger. *Geriatrics, 3:* 166–170, 1948.

ALLEE, W. C.—Bernard Greenberg, G. M. Rosenthal, and Peter Frank. Some Effects of Social Organization on Growth in the Green Sunfish, Lepomis cyanellus. *Journal of Experimental Zoology, 108:* 1–20, 1948.

AMOROSO, M. D.—(See Barnes, T. C.)

ANESTHESIA—Anesthetic Management of the Aged. C. S. Turville and R. D. Dripps. *Pennsylvania Medical Journal, 51:* 434–436, 1948. Abstract, *International Surgical Digest, 45:* 220–222, 1948.

ANONYMOUS—Cancer in an Aging Population. *Texas Cancer Bulletin, 1:* 18, 1948.

Careers for the Old. *Lancet, 254:* no. 6502, 564, 1948.

Exercise in Middle Age. *British Medical Journal:* no. 4555, 816–817, 1948.

Exercise in Middle Age. *British Medical Journal:* no. 4558, 964, 1948.

Fatty Acid Deficiency in Mature Rats. *Nutrition Reviews, 6:* 149–151, 1948.

Flatus in the Elderly. *British Medical Journal:* no. 4555, 818, 1948.

For Elderly Ambulatory Patients. *Hospital Management, 65:* 33, 1948.

Funny Money; Crank's Dreams of Curing World's Economic and Social Ills. *Fortune, 37:* 136, April, 1948.

Gray Hair and Good Looks. *Good Housekeeping, 126:* 179, June, 1948.

Growth-promoting Substances in Horticulture. *Nature, 161:* 656, 1948.

Hormones Check Aging? *Science News Letter, 53:* 311, 1948.

How to Grow Younger. *Time, 51:* 65, May 24, 1948.

Incontinence of Urine in the Elderly. *British Medical Journal:* no. 4555, 817–818, 1948.

Inflation vs. Social Security; Old-age Insurance. *U.S. News, 24:* 40–43, May 28, 1948.

Life Begins at Forty Plus. *Business Week:* 26, May 1, 1948.

Life Expectancy at High Altitudes. *Journal of the American Medical Association, 136:* 417, 1948.

A New Home for Old People. *Lancet:* no. 6507, 774, 1948.

Nocturnal Frequency in Elderly Men. *British Medical Journal:* no. 4552, 672, 1948.

Old Age. A Review of A. L. Vischer's "Old Age: Its Compensations and Rewards." *Medical Journal of Australia, 1:* 555, 1948.

Old Folks Adrift. *Oral Hygiene, 37:* 1926–1929, 1947.

Planning Your Retirement Income. *Medical Economics, 25:* 89–97, 1948.

Prevention of Infirmity. *British Medical Journal:* no. 4562, 1142–1143, 1948.

Problems of Old Age. Review of "The Social Medicine of Old Age, Report of an Inquiry in Wolverhampton" by J. H. Sheldon. *Journal of the Royal Institute of Public Health and Hygiene, 2:* 204–210, 1948.

Public Health and the Diseases of Old Age. *Statistical Bulletin Metropolitan Life Insurance Company, 29:* no. 4, 1–3, 1948.

Record Longevity in Prospect for Babies of 1947. *Statistical Bulletin Metropolitan Life Insurance Company, 29* no. 3, 3–4, 1948.

The Swiss Compulsory Old-age and Survivors' Insurance Scheme. *International Labour Review, 56:* 190–192, 1947.

ANTRIM, D. K.—How Long Will You Live? *Rotarian, 72:* 14–16, May 1948.

APPENDICITIS — Acute Appendicitis after Middle Life. Otis F. Lamson. *Northwest Medicine, 47:* 279–280, 1948.

ARSHAVSKY, I. A.—Vosrastnoi Fiziologii na VII Vsesoiusnom Sezde Fiziologov; 20–28 VIII. 1947 (Problems of Age Factors in Physiology at the VII Pan-Union Congress of Physiologists, Biochemists, and Pharmacologists, 20–28, VIII, 1947) *Pediatria,* Moskva: no. 5–13, 1948.

ARTERIOSCLEROSIS—Dissecting Aneurysm of the Aorta: Report of a Case with Anuria, and Prolongation of Life by Peritoneal Lavage. Benjamin Abeshouse, Louis H. Tankin, and Samuel Lerman. *Urologic and Cutaneous Review, 52:* 196–203, 1948.

ASHBY, WINIFRED—The Span of Life of the Red Blood Cell. *Blood—The Journal of Hematology, 3:* 486–500, 1948.

ASKONAS, BRIGETTE *A.*—(See Stern, Karl, and James S. Tyhurst.)

ASLING, C. WILLET—(See Becks, Hermann, Daniel A. Collins, Miriam E. Simpson, and Herbert M. Evans.)

ASLING, C. WILLET—(See Becks, Hermann, Miriam E. Simpson, Robert Scow, and Herbert M. Evans.)

BAB, HANS—The Process of Ageing. *British Medical Journal:* no. 4559, 1000, 1948.

BACON, R. L.—Changes with Age in the Reticular Fibers of the Myocardium of the Mouse. *American Journal of Anatomy, 82:* 469–495, 1948.

BACTERIOLOGY—The Relationship of the Age of the Bacterial Culture to the Delay in Sulfonamide Bacteriostasis. A. S. Youmans. *Journal of Bacteriology, 55:* 503–515, 1948.

BAER, MARIANNE—(See Quastler, Henry.)

BALDNESS—Anatomical Factors in Senile Alopecia; Experimental Production of Baldness. Abstract, M. Wharton Young. *Anatomical Record, 97:* 378–379, 1947.

BARNES, T. C.—and M. D. Amoroso. The Effect of Age of the Human Brain on the Electroencephalogram during Hyperventilation. Abstract, *Anatomical Record, 99:* 622–623, 1947.

BEBÍN, J.—and V. Paredes. Demencia Presenil Hereditaria por Atrofia Cortical (¿Enfermedad de Pick?) (Hereditary Presenile Dementia by Reason of Cortical Atrophy ((Pick's Disease?))). *Revista Neuro-Psiquiatria, 10:* 177–188, 1947. Abstract, *Psychological Abstracts, 22:* 340, 1948.

BECKS, HERMANN—C. Willet Asling, Daniel A. Collins, Miriam E. Simpson, and Herbert M. Evans. Changes with Increasing Age in the Ossification of the Third Metacarpal of the Female Rat. *Anatomical Record, 100:* 577–592, 1948.

BECKS, HERMANN—Miriam E. Simpson, Robert Scow, C. Willet Asling, and Herbert M. Evans. Skeletal Changes in Rats Thyroidectomized on the Day of Birth and the Effects of Growth Hormones in Such Animals Tibia, Metacarpal, and Caudal Vertebrae. *Anatomical Record, 100:* 561–576, 1948.

BERGHOFF, R. S.—The Aging Heart. *Postgraduate Medicine, 2:* 24–29, 1947.

BIOCHEMISTRY—Distribution of Tissue Components in the Female Leg From Birth to Maturity. Earle L. Reynolds. *Anatomical Record, 100:* 621–630, 1948.

Effect of Magnesium on Alkaline Phosphatase as Influenced by pH, Enzyme Concentration and Aging. C. J. Fischer and R. O. Greep. *Federation Proceedings, 7:* 34, 1948.

Nitrogen Balance Studies under Prolonged High Nitrogen Intake Levels in Elderly Individuals. W. B. Kountz, Lilli Hofstatter, and Philip Ackermann. *Geriatrics, 3:* 171–184, 1948.

Note on Hippuric Acid Synthesis in Senility. Karl Stern, James S. Tyhurst, and Brigette A. Askonas. *American Journal of the Medical Sciences, 212:* 302–305, 1946.

Phosphate Clearances in Infants and Adults. R. F. A. Dean and R. A. McCance. *Journal of Physiology, 107:* 182–186, 1948.

BIRREN, JAMES E.—(See Fisher, M. Bruce.)

BLOOD—The Span of Life of the Red Blood Cell. Winifred Ashby. *Blood—The Journal of Hematology, 3:* 486–500, 1948.

Blood Changes in the Aged. O. Olbrich. *Edinburgh Medical Journal, 55:* 100–115, 1948.

Fraktionering af Serumproteinerne hos Normale Gamle (Serum Protein Fractions of Normal Old People). Jorgen Bock. *Nordisk Medicin, 4:* 792–797, 1948.

Haemoglobin Levels at Different Ages. L. B. Pett and G. F. Ogilvie. *Canadian Medical Association Journal, 58:* 353–355, 1948.

BLUESTONE, E. M.—Home Care. An Extramural Hospital Function. *Survey:* April, 1948, 4 pages.

BOCK, JORGEN—Fraktionering af Serumproteinerne hos Normale Gamle (Serum Protein Fractions of Normal Old People). *Nordisk Medicin, 4:* 792–797, 1948.

BOGOMOLETS ACS—Effect of Bogomolets' Antireticular Cytotoxic Serum upon Experimental Tumors. M. F. Runova. *Biulleten eksperimental 'noi biologii, 24:* no. 7, 17, 1947.

BONE—Changes with Increasing Age in the Ossification of the Third Metacarpal of the Female Rat. Hermann Becks, C. Willet Asling, Daniel A. Collins, Miriam E. Simpson, and Herbert M. Evans. *Anatomical Record, 100:* 577–592, 1948.

Diagnose und Behandlung der Senilen Osteoporose und der Osteomalazie. H. G. Schmitt. *Klinik und Praxis, 1:* 40–43, 1946.

Studio sulle Variazoni Individuali e Topografishe della Resistenze Meccanica del Tessuto Osseo Diafisario Umano in Diverse Età (Individual and Topographic

Variations of the Mechanic Resistance in the Bone Tissue of Human Diaphyses at Various Ages). Giorgio Maj. *Archivo italiano di anatomia e di embriologia, 47:* 612–633, 1942.

BORLAND, H.—Case for the 'Old Man' of 45. *New York Times Magazine:* 13+, Mar. 7, 1948. *Science Digest, 23:* 57–60, June, 1948.

BORROW, A.—L. Fowden, M. M. Stedman, J. C. Waterlow, and R. A. Webb. A Growth-retarding Factor in Maize Bran. *Lancet, 254:* no. 6507, 752–753, 1948.

BORTZ, E. L.—Geriatrics as a Specialty. *Journal of the Omaha Clinical Society, 9:* no. 2, 40–46, 1948.

BOTANY—Ueber einen Wachstumshemmstoff in Alternden Diatomeenkulturen. D. V. Denfefer. *Biologisches Zentralblatt, 67:* 7–13, 1948.

BOURLIÈRE, FRANÇOIS — Quelques Caracteristiques de la Senescence chez la Rat (Some Physiological Characteristics of Senescence in the Rat). *Revue Canadienne de Biologie, 6:* 245–254, 1947. Abstract, *Physiological Abstracts, 22:* 323, 1948, and *Biological Abstracts, 22:* 863, 1948.

BOWERSBUCH, MARGARETTA KELLER—(See Gidro-Frank, Lothar.)

BRAUNSCHNEIDER, G. E.—H. R. Hunt, and C. A. Hoppert. The Influence of Age in the Development of Dental Caries in the Rat (Rattus norvegicus). *Journal of Dental Research, 27:* 154–160, 1948.

BRINK, V. E.—Old Age Is What You Make It. *Rotarian, 72:* 57, Feb., 1948.

BROCHNER-MORTENSEN, G.—Alderdom og Miljo (Old Age and Environment). *Menneske og Miljo, 1:* 119–121, 1946. Abstract, *Physiological Abstracts, 22:* 323, 1948.

CAMERON, G. R.—and R. D. Seneviratne. Growth and Repair in Adipose Tissue. *Journal of Pathology and Bacteriology, 59:* 665–676, 1947.

CANCER—Cancer in Aging Population. Anon. *Texas Cancer Bulletin, 1:* 18, 1948.

Cancer Mortality in Denmark. J. Nielsen and M. Lindhardt. *Ugeskrift for Laeger, 104:* 468–475, 1942.

Physiological Age Compared with Chronological Age as a Means of Computing Mammary Cancer Rates in Mice. W. S. Murray. *Unio Internationalis Contra Cancrum, Acta, 5:* 85–91, 1940.

Present Incidence and Survival Picture in Cancer Among Females in Connecticut 1935–1946. Eleanor J. Macdonald. *Journal of the American Medical Women's Association, 3:* 152–162, 1948.

CARR, D. D.—Medical Care of the Aged in Shawnee County, Kansas. *Quarterly Bulletin of the Indiana University Medical Center, 9:* 14–17, Oct., 1947.

CHENTZE, HSIANG WU—and M. B. Visscher. Measurement of Blood Pressure in the Mouse with Special Reference to Age. Abstract, *Federation Proceedings, 66:* 231, 1947.

CHODOFF, PAUL—Alexander Simon, and Walter Freeman. Pneumoencephalographic Diagnosis in the Presenile Dementias. *American Journal of Roentgenology and Radium Therapy, 59:* 311–317, 1948.

CHRONIC ILLNESS—Chronic Illness as a Public Health Problem. William F. King. *Geriatrics, 3:* 157–162, 1948.

Rehabilitation of the Aged Sick. J. M. Crosland. *Medical Press, London, 218:* 421, 1947.

CINBERG, BERNARD L.—Management of Descensus Uteri in the Aged. *Geriatrics, 3:* 151–156, 1948.

CLIMACTERIC—Blutungen in der Menopause. H. Husslein. *Klinicheskaya meditsina, 3:* 86–93, 1948.

CLOSE, K.—Grandpa Wants to Work. *Survey Graphic, 37:* 288–292, 1948.

COLLINS, DANIEL A.—(See Becks, Hermann, C. Willet Asling, Miriam E. Simpson, and Herbert M. Evans.)

COLLINS, JAMES A. J.—(See Stainsby, Wendell J.)

COSIN, L. Z.—Modern Methods in Care of the Aged. *Journal of the Royal Institute of Public Health and Hygiene, 11:* 122–135, 1948.

CRAMPTON, C. W.—The Science of Geriatrics. *Merck Report, 57:* no. 1, 15–18, 1948.

CROSLAND, J. M.—Rehabilitation of the Aged Sick. *Medical Press, London, 218:* 421, 1947.

DANIEL, J. I.—Premium on Youth; Preferences for Younger Ministers. *Christian Century, 65:* 478–480, 1948. Discussion; *Christian Century, 65:* 601, 1948.

DAVIES, B.—Silver-headed Canada. *Canadian Forum, 28:* 36, May, 1948.

DE AJURIAGUERRA, J.—(See Marchand, L.)

DEAN, R. F. A.—and R. A. McCance. Phosphate Clearances in Infants and Adults. *Journal of Physiology, 107:* 182–186, 1948.

DEEVEY, E. S., JR.—Life Tables for Natural Populations of Animals. *Quarterly Review of Biology, 22:* 283–314, 1947.

DENFEFER, D. V.—Ueber Einen Wachstumshemmstoff in Alternden Diatomeenkulturen. *Biologisches Zentralblatt, 67:* 7–13, 1948.

DENZ, F. A.—Age Changes in Lymph Nodes. *Journal of Pathology and Bacteriology, 59:* 575–591, 1947.

DIABETES—Diabetes Mellitus. An Analysis of 250 Cases and a Discussion of Simplified Procedures for Regulation. Wendell J. Stainsby and James A. Collins, Jr. *Pennsylvania Medical Journal, 50:* 808–811, 1947.

DIBLE, J. H.—J. McMichael and S. Sherlock. Chronic Retention Jaundice in Elderly Patients. *Gastroenterology, 9:* 736–746, 1947.

DOLL, EDGAR A.—Note on the Age Placement of Year-scale Tests. *Journal of Consulting Psychology, 11:* 144–147, 1947.

DRIPPS, ROBERT—(See Turville, Charles S.)

DUCA, C. J.—Age Specific Susceptibility to Tuberculosis; Experiments on Guinea Pigs and Rats. *American Review of Tuberculosis, 57:* 99, 1948.

DUGUID, J. B.—Surgical and Medical Problems of Old Age. *Nursing Mirror and Midwives Journal, 86:* 385, 1948.

DULTA, P. C.—Elderly Primagravidae. *Journal of Obstetrics and Gynaecology of the British Empire, 55:* 68–70, 1948.

ELLMAN, ALBERT D.—(See Stearns, A. Warren)

EMPLOYMENT—Careers for the Old. Anon. *Lancet, 254:* no. 6502, 564, 1948.

Causes of Mortality Among Employed Persons (1927–1945). Christian F. Schrier. *Industrial Medicine, 17:* 47–51, Feb., 1948. Abstract, *Digest of Neurology and Psychiatry, 16:* 219, 1948.

Grandpa Wants to Work. K. Close. *Survey Graphic, 37:* 288–292, 1948.

Our Aging Workers. A. A. Morey. *National Safety News, 57:* no. 5, 24–25, 70, 72–73, 1948.

Studies on Age and Wastage in Industrial Population; Age and Incidence. R. Padley. *British Journal of Social Medicine, 1:* 13–37, 1947.

ENDOCRINOLOGY—Hyaluronidase Levels of Rat Testes as Related to Aged, Hypophysectomy and Cryptorchidism. S. L. Leonard and P. J. Perlman. *Endocrinology, 42:* 176–180, 1948.

EPILEPSY—Les Épilepsies Tardives et Séniles. Le Marchard and J. de Ajuriaguerra. *Annales médico-psychologiques, 103:* 305–331, 1945. Abstract, *Psychological Abstracts, 22:* 225, 1948.

EVANS, HERBERT M.—(See Becks, Hermann, C. Willet Asling, Daniel A. Collins, and Miriam E. Simpson.

EVANS, HERBERT M.—(See Becks, Hermann, Miriam E. Simpson, Robert Scow, and C. Willet Asling.

EXERCISE—Exercise in Middle Age. Anon. *British Medical Journal:* no. 4555, 816–817, 1948.

Exercise in Middle Age. Anon. *British Medical Journal:* no. 4558, 964, 1948.

FARRIS, EDMOND J.—(See Yeakel, Eleanor H.)

FISCHER, C. J.—and R. O. Greep. Effect of Magnesium on Alkaline Phosphatase as Influenced by pH, Enzyme Concentration and Aging. *Federation Proceedings, 7:* 34, 1948.

FISHBERG, ARTHUR M.—Sympathectomy for Essential Hypertension. *Journal of the American Medical Association, 137:* 670–675, 1948.

FISHER, M. BRUCE—and James E. Birren. Age and Strength. *Journal of Applied Psychology, 31:* 490–497, 1947. Abstract, *Psychological Abstracts, 22:* 245, 1948.

FLATUS—Flatus in the Elderly. Anon. *British Medical Journal:* no. 4555, 818, 1948.

FOULDS, G. A.—and J. C. Raven. Normal Changes in the Mental Abilities of Adults as Age Advances. *Journal of Mental Science, 44:* 133–142, 1948.

FOWDEN, L.—(See Borrow, A., M. M. Stedman, J. C. Waterlow, and R. A. Webb.)

FOWLER, EDMUND PRICE — Grandma Can Hear if She Wants to Hear. *Hygeia, 26:* 470–471, 518–519, 1948.

FRANK, PETER—(See Allee, W. C., Bernard Greenberg, and G. M. Rosenthal.)

FREEMAN, WALTER—(See Chodoff, Paul, and Alexander Simon.)

GENERAL—The Aging, the Aged. O. A. Randall. *Public Health Nursing, 40:* 66–71, 1948.

Alderdom og Miljo (Old Age and Environment). G. Brochner-Mortensen. *Menneske og Miljo, 1:* 119–121, 1946. Abstract, *Physiological Abstracts, 22:* 323, 1948.

Case for the 'Old Man' of 45. H. Borland. *New York Times Magazine:* 13+, Mar. 7, 1948. *Science Digest, 23:* 57–60, June, 1948.

Grandma Can Hear if She Wants to Hear. Edmund Price Fowler. *Hygeia, 26:* 470–471, 518–519, 1948.

Gray Hair and Good Looks. Anon. *Good Housekeeping, 126:* 179, June, 1948.

Growing Old, a Review of "The Years after Fifty" by Wingate M. Johnson. D. V. Hubble. *British Medical Journal:* no. 4551, 603, 1948.

Helping the Old. K. M. Oswald. *Lancet:* no. 6507, 770, 1948.

How to Grow Younger. Anon. *Time, 51:* 65, May 24, 1948.

How Long Will You Live? D. K. Antrim. *Rotarian, 72:* 14–16, May, 1948.

The Latin Poet Maximianus on the Miseries of Old Age. Max Neuberger. *Bulletin of the History of Medicine, 21:* 113–119, 1947. Abstract, *Psychological Abstracts, 22:* 194, 1948.

Life Begins at Forty Plus. Anon. *Business Week:* 26, May 1, 1948.

Medical Health Services for Elderly Persons. C. Rolleston. *Medical Officer, 79:* 25, 1948.

New Horizons for Old Age. T. G. Klumpp. *Connecticut Medical Journal, 12:* 224–249, 1948.

Old Age, a Review of A. L. Vischer's "Old Age: Its Compensations and Rewards." Anon. *Medical Journal of Australia, 1:* 555, 1948.

Old Age Is What You Make It. V. E. Brink. *Rotarian, 72:* 57, Feb., 1948.

Old Folks Adrift. Anon. *Oral Hygiene, 37:* 1926–1929, 1947.

Old Folks Get a New Look. J. LaCerda and B. Barnes. *Nations Business, 36:* 59–60+, 1948.

On Growing Old. E. M. Rowell. *Hibbert Journal, 46:* 45–48, Oct., 1947.

Premium on Youth; Preferences for Younger Ministers. J. I. Daniel. *Christian Century, 65:* 478–480, 1948. Discussion, *Christian Century, 65:* 601, 1948.

Prevention of Infirmity. Anon. *British Medical Journal:* no. 4562, 1142–1143, 1948.

Problems of Aging. R. D. Loewenberg. *Health Bulletin, Bakersfield:* 2–4, Oct., 1947.

Problems of Old Age, a Review of "The Social Medicine of Old Age" by J. H. Sheldon. Anon. *Journal of the Royal Institute of Public Health and Hygiene, 2:* 204–210, 1948.

Silver-headed Canada. B. Davies. *Canadian Forum, 28:* 36, May, 1948.

So Now You're Middle-aged. Roy R. Grink. Abstract, *Psychological Abstracts, 22:* 194, 1948.

Social Problems of Old Age. E. L. Sturdee. *Nursing Mirror and Midwives Journal, 86:* 349, 1947.

Some Aspects of Old Age. J. H. Sheldon. *Lancet:* no. 6504, 621–624, 1948.

Unwanted Women; Emptiness in Lives of Many Women Forty and Over. J. M. Wood. *Womans Home Companion, 75:* 38+, May, 1948.

What's Wrong with Growing Old? G. Rubin-Rabson. *Hygeia, 26:* 278–280+, 1948.

GERIATRICS — Administrative and Clinical Problems of Chronic Sickness (the Diseases of Later Life). James Whigham Affleck. *Glasgow Medical Journal, 29:* 99–115, 1948.

Application to the Elderly of the Principles of Preventive Medicine. I. A. G. MacQueen. *Health Bulletin, Edinburgh, 6:* no. 2, 25–27, 1948.

Clinical Problems of Aging and of the Aged. J. Meyer. *Medical Clinics of North America, 32:* 223–229, 1948.

Diseases in Middle Life and Beyond. T. P. Murdock. *Public Health Nursing, 39:* 613–615, 1947.

Geriatrics. A. Simon. *American Journal of Psychiatry, 104:* 476, 1948.

Geriatrics as a Specialty. E. L. Bortz. *Journal of the Omaha Clinical Society, 9:* no. 2, 40–46, 1948.

Health in an Aging Population. E. J. Stieglitz. *Bulletin of the Medical Society, County of Monroe, 5:* 313–315, 1948.

Medical Care of the Aged in Shawnee County, Kansas. D. D. Carr. *Quarterly Bulletin of the Indiana University Medical Center, 9:* 14–17, Oct., 1947.

Medical Science and the Longer Life. E. R. Long. *Science, 107:* 305–317, 1948.

Normal Temperature in Old Age. Trevor H. Howell. *Lancet:* no. 6501, 517, 1948.

Physical Medicine in the Care of the Aged and Chronic Sick. Alan Stoddard. *British Journal of Physical Medicine, 2:* 10–13, 1948.

Physical Medicine and Geriatric Problems. Trevor H. Howell. *British Journal of Physical Medicine, 2:* 40–42, 1948.

Physical Medicine in the Treatment of the Aged. Walter S. McClellan, *Journal of the American Medical Association, 137:* 130–133, 1948.

The Process of Aging. Hans Bab. *British Medical Journal:* no. 4559, 1000, 1948.

Public Health and the Diseases of Old Age. Anon. *Statistical Bulletin of the Metropolitan Life Insurance Co., 29:* no. 4, 1–3, 1948.

The Science of Geriatrics. C. W. Crampton. *Merck Report, 57:* no. 1, 15–18, 1948.

Therapy of the Aged. E. J. Stieglitz. *Medical Annals of the District of Columbia, 17:* 197–204, 1948.

The Years of Victory; a Geriatric Commentary. R. J. Matthews. *Medical Officer, 78:* 273–275, 1947.

GERONTOLOGY—Gerontology and Its Application to Medicine and Sociology. H. P. K. Agersborg. Abstract, *Anatomical Record, 99:* 579–580, 1947.

GIDRO-FRANK, LOTHAR — and Margaretta Keller Bowersbuch. A Study of the Plantar Response in Hypnotic Age Regression. *Journal of Nervous and Mental Diseases, 107:* 443–458, 1948.

GITELSON, MAXWELL—The Emotional Problems of Elderly People. *Geriatrics, 3:* 135–150, 1948.

GLANDS—Mammary Glands of the Rat During Growth and Senescence. V. Warbritton and R. P. Reece. *Experimental Medicine and Surgery, 5:* 33–48, 1947.

GOVER, MARY—(See Moriyama, I. M.)

GRAYBIEL, A.—(See Horowitz, O.)

GRECO, GABRIEL F.—Coronary Artery Disease in Older Patients. *New York State Journal of Medicine, 48:* 1153–1156, 1948.

GREENBERG, BERNARD—(See Allee, W. C., G. M. Rosenthal, and Peter Frank.)

GREEP, R. O.—(See Fischer, C. J.)

GRINK, ROY R.—So Now You're Middle-aged. Abstract, *Psychological Abstracts, 22:* 194, 1948.

GROWTH—Evidence for Ageing as a Consequence of Growth Cessation. Albert I. Lansing. *Proceedings of the National*

Academy of Science, 34: 304–310, 1948. Abstract, *Anatomical Record, 99:* 579, 1948.

Growth-promoting Substances in Horticulture. Anon. *Nature, 161:* 656, 1948.

Growth and Repair in Adipose Tissue. G. R. Cameron and R. D. Seneviratne. *Journal of Pathology and Bacteriology, 59:* 665–676, 1947.

Growth-retarding Factor in Maize Bran. A. Borrow, L. Fowden, M. M. Stedman, J. C. Waterlow, and R. A. Webb. *Lancet, 254:* no. 6507, 752–753, 1948.

Influence of Vitamin A Deficiency on the Gross Efficiency of Growth of Rats. Jean Mayer. *Yale Journal of Biology and Medicine, 20:* 403–405, 1948.

Inhibition of Plant Growth by Irradiation. I. Discrete Steps of Growth Inhibition and Pattern of Dose-response-relation. Henry Quastler and Marianne Baer. *Journal of Cellular and Comparative Physiology, 31:* 213–234, 1948.

Some Effects of Social Organization on Growth in the Green Sunfish, Lepomis cyanellus. W. C. Allee, Bernard Greenberg, G. M. Rosenthal, and Peter Frank. *Journal of Experimental Zoology, 108:* 1–20, 1948.

GYNECOLOGY — Management of Descensus Uteri in the Aged. Bernard L. Cinberg. *Geriatrics, 3:* 151–156, 1948.

Seniets Gynekologi (The Gynaecology of Old Age). Gideon Ahltorp. *Nordisk Medicin, 37:* 12–15, 1948.

HAIST, R. E.—and E. J. Pugh. Volume Measurement of the Islets of Langerhans and the Effects of Age and Fasting. *American Journal of Physiology, 152:* 36–41, 1948.

HANKS, JOHN H.—The Longevity of Chick Tissue Cultures without Renewal of Medium. *Journal of Cellular and Comparative Physiology, 31:* 235–260, 1948.

HARTCROFT, W. S. — Renal Histological Changes in Rats of Various Ages Deprived of Dietary Choline. *Revue Canadienne de Biologie, 7:* 184, 1948.

HEART—The Aging Heart. R. S. Berghoff. *Postgraduate Medicine, 2:* 24–29, 1947.

Changes with Age in the Reticular Fibers of the Myocardium of the Mouse. R. L. Bacon. *American Journal of Anatomy, 82:* 469–495, 1948.

Coronary Artery Disease in Older Patients. Gabriel F. Greco. *New York State Journal of Medicine, 48:* 1153–1156, 1948.

Prolongation of the Q-T Interval in the Electrocardiogram Occurring as a Temporary Functional Disturbance in Healthy Persons with a Proposal that (Q-T) Cal. May Be Used to Designate Q-T Intervals Calculated for the Physiologic Variables, Cycle Length, Age, and Sex. O. Horwitz and A. Graybiel. *American Heart Journal, 35:* 480–484, 1948.

Statistical Studies of Heart diseases. I. Heart Diseases and Allied Causes of Death in Relation to Age Changes in the Population. I. M. Moriyama and Mary Gover. *Public Health Report, 63:* 537–545, 1948.

HERRMAN, HEINZ—and J. S. Nicholas—Enzymatic Liberation of Inorganic Phosphate from Adenosinetriphosphate in Developing Rat Muscle. *Journal of Experimental Zoology, 107:* 177–182, 1948.

HERRMAN, HEINZ—and J. S. Nicholas. Quantitative Changes in Muscle Protein Fractions During Rat Development. *Journal of Experimental Zoology, 107:* 165–176, 1948.

HINTON, J. WILLIAM—End Results of Thoracolumbar Sympathectomy for Advanced Essential Hypertension. *Bulletin of the New York Academy of Medicine, 24:* 239–252, 1948.

HOFSTATTER, LILLI—(See Kountz, W. B., and Philip Ackermann.)

HOMES—A New Home for Old People. Anon. *Lancet:* no. 6507, 774, 1948.

HOPPERT, C. A. — (See Braunschneider, G. E., and H. R. Hunt.)

HORMONES—Effects of Sex and Thyroid Hormones on the Process of Ageing in Female Rats. V. Korenchevsky. *British*

Medical Journal: no. 4554, 728–731, 1948.

Hormones and the Aging Process; Testosterone. T. H. McGavack. *New York State Journal of Medicine, 3:* no. 24, 15–18, 1947.

Hormones Check Aging? Anon. *Science News Letter, 53:* 311, 1948.

Skeletal Changes in Rats Thyroidectomized on the Day of Birth and the Effects of Growth Hormone in Such Animals Tibia, Metacarpal, and Caudal Vertebrae. Hermann Becks, Miriam E. Simpson, Robert Scow, C. Willet Asling, and Herbert M. Evans. *Anatomical Record, 100:* 561–576, 1948.

HORWITZ, O.—and A. Graybiel. Prolongation of the Q-T Interval in the Electrocardiogram Occurring as a Temporary Functional Disturbance in Healthy Persons with a Proposal that (Q-T) Cal. May Be Used to Designate Q-T Intervals Calculated for the Physiologic Variables, Cycle Length, Age, and Sex. *American Heart Journal, 35:* 480–484, 1948.

HOSPITALS—For Elderly Ambulatory Patients. Anon. *Hospital Management, 65:* 33, 1948.

Home Care. An Extramural Hospital Function. E. M. Bluestone. *Survey;* 4 pages, April, 1948.

HOWELL, TREVOR H.—Normal Temperature in Old Age. *Lancet:* no. 6501, 517, 1948.

HOWELL, TREVOR H.—Physical Medicine and Geriatric Problems. *British Journal of Physical Medicine, 2:* 40–42, 1948.

HUBBLE, D. V.—Growing Old, a Review of "The Years After Fifty" by Wingate M. Johnson. *British Medical Journal:* no. 4551, 603, 1948.

HUNT, H. R.—(See Braunschneider, G. E., and C. A. Hoppert.)

HUSSLEIN, H.—Blutungen in der Menopause. *Klinische Medicin, 3:* 86–93, 1948.

HYPERTENSION—End Results of Thoracolumbar Sympathectomy for Advanced Essential Hypertension. J. William Hinton. *Bulletin of the New York Academy of Medicine, 24:* 239–252, 1948.

Measurement of Blood Pressure in the Mouse with Special Reference to Age. Hsiang Wu Chentze and M. B. Visscher. Abstract, *Federation Proceedings, 66:* 231, 1947.

JAUNDICE—Chronic Retention Jaundice in Elderly Patients. J. H. Dible, J. McMichael, and S. Sherlock. *Gastroenterology, 9:* 736–746, 1947.

KETT, C. H.—(See Roberts, P. H., and M. A. Ohlson.)

KETTESY, A.—On Genesis and Operation of Senile Entropion. *British Journal of Ophthalmology, 32:* 311–313, 1948.

KING, WILLIAM F.—Chronic Illness as a Public Health Problem. *Geriatrics, 3:* 157–162, 1948.

KLUMPP, T. G.—New Horizons for Old Age. *Connecticut Medical Journal, 12:* 224–249, 1948.

KOCH, F. L. PHILIP—Some Practical Aspects of Geriatric Ophthalmology. *Geriatrics, 3:* 163–165, 1948.

KORENCHEVSKY, V.—Effects of Sex and Thyroid Hormones on the Process of Ageing in Female Rats. *British Medical Journal:* no. 4554, 728–731, 1948.

KOUNTZ, W. B.—Lilli Hofstatter, and Philip Ackermann. Nitrogen Balance Studies under Prolonged High Nitrogen Intake Levels in Elderly Individuals. *Geriatrics, 3:* 171–184, 1948.

KURZROK, R.—(See Leonard, S. L., and P. J. Perlman.)

LA CERDA, J.—and B. Barnes. Old Folks Get a New Look. *Nations Business, 36:* 59–60+, 1948.

LAMSON, OTIS F.—Acute Appendicitis After Middle Life. *Northwest Medicine, 47:* 279–280, 1948.

LANSING, ALBERT I.—Evidence for Ageing as a Consequence of Growth Cessation. *Proceedings of the National Academy of Science, 34:* 304–310, 1948. Abstract, *Anatomical Record, 99:* 579, 1948.

LEGGETT, B. J.—Radiological Evidence of Age. *British Medical Journal, 1:* 368, 1948.

LEONARD, S. L.—P. J. Perlman, and R. Kurzrok. Hyaluronidase Levels of Rat Testes as Related to Age, Hypophysectomy and Cryptorchidism. *Endocrinology, 42:* 176–180, 1948.

LERMAN, SAMUEL—(See Abeshouse, Benjamin, and Louis H. Tankin.)

LÉVY, JEANNE—and Roger Meyer. Variations in Sensitivity as Related to Age of the Parents. *Comptes rendus des séances de la Société de biologie, 140:* 447–448, 1946.

LINDHARDT, M.—(See Nielsen, J.)

LIVER—Changes with Age in the Weight of the Liver in Wistar Albino Rats. Eleanor H. Yeakel and Edmond J. Farris. Abstract, *Anatomical Record, 97:* 377–378, 1947.

LOEWENBERG, R. D.—Problems of Aging. *Health Bulletin, Bakersfield;* 2–4, Oct., 1947.

LONG, E. R.—Medical Science and the Longer Life. *Science, 107:* 305–307, 1948.

LONGEVITY—Life Expectancy at High Altitudes. Anon. *Journal of the American Medical Association, 136:* 417, 1948.

Life Tables for Natural Populations of Animals. E. S. Deevey, Jr. *Quarterly Review of Biology, 22:* 283–314, 1947.

Longevity of Chick Tissue Cultures without Renewal of Medium. John H. Hanks. *Journal of Cellular and Comparative Physiology, 31:* 235–260, 1948.

Record Longevity in Prospect for Babies of 1947. Anon. *Statistical Bulletin Metropolitan Life Insurance Co., 29:* no. 3, 3–4, 1948.

LYMPH NODES—Age Changes in Lymph Nodes. F. A. Denz. *Journal of Pathology and Bacteriology, 59:* 575–591, 1947.

MACDONALD, ELEANOR J.—The Present Incidence and Survival Picture in Cancer Among Females in Connecticut 1935–1946. *Journal of the Medical Womens Association, 3:* 152–162, 1948.

MACKINTOSH, J. M.—Child Guidance in Old Age. *Public Health Nursing, 39:* 538, 1947.

MAC QUEEN, I. A. G.—Application to the Elderly of the Principles of Preventive Medicine. *Health Bulletin, Edinburgh, 6:* no. 2, 25–27, 1948.

MAJ, GIORGIO—Studio sulle Variazoni Individuali e Topografiche della Resistenze Meccanica del Tessuto Osseo Diafisario Umano in Diverse Età (Individual and Topographic Variations of the Mechanic Resistance in the Bone Tissue of Human Diaphyses at Various Ages). *Archivio italiano di anatomia e di embriologia, 47:* 612–633, 1942.

MARCHAND, L.—and J. de Ajuriaguerra. Les Epilepsies Tardives et Séniles. *Annales médico-psychologiques, 103:* 305–331, 1945. Abstract, *Psychological Abstracts, 22:* 225, 1948.

MATTHEWS, R. J.—The Years of Victory; a Geriatric Commentary. *Medical Officer, 78:* 273–275, 1947.

MAYER, JEAN. Influence of Vitamin A Deficiency on the Gross Efficiency of Growth of Rats. *Yale Journal of Biology and Medicine, 20:* 403–405, 1948.

MCCANCE, R. A.—(See Dean, R. F. A.)

MCCAY, C. M.—Nutrition for the Aged. *Report of the New York Legislative Committee on Nutrition, 1:* 128–134, 1947.

MCCLELLAN, WALTER S.—Physical Medicine in the Treatment of the Aged. *Journal of the American Medical Association, 137:* 130–133, 1948.

MCGAVACK, T. H.—Hormones and the Aging Process; Testosterone. *New York State Journal of Medicine, 3:* no. 24, 15–18, 1947.

MCMICHAEL, J.—(See Dible, J. H., and S. Sherlock.)

METABOLISM—Metabolism in Old Age. N. W. Shock. *Bulletin of the New York Academy of Medicine, 24:* 166–178, 1948.

Volume Measurement of the Islets of Langerhans and the Effects of Age and Fasting. R. E. Haist and E. J. Pugh. *American Journal of Physiology, 152:* 36–41, 1948.

MEYER, J.—Clinical Problems of Aging and of the Aged. *Medical Clinics of North America, 32:* 223–229, 1948.

MEYER, ROGER—(See Lévy, Jeanne.)

MOORE, R. F.—Subjective "lighting streaks." *British Journal of Ophthalmology, 31:* 46–50, 1947.

MOREY, A. A.—Our Aging Workers. *National Safety News, 57:* no. 5, 24–25, 70, 72–73, 1948.

MORIYAMA, I. M.—and Mary Gover. Statistical Studies of Heart Diseases. I. Heart Diseases and Allied Causes of Death in Relation to Age Changes in the Population. *Public Health Report, Washington, 63:* 537–545, 1948.

MURDOCK, T. P.—Diseases in Middle Life and Beyond. *Public Health Nursing, 39:* 613–615, 1947.

MURRAY, W. S.—Physiological Age Compared with Chronological Age as a Means of Computing Mammary Cancer Rates in Mice. *Unio Internationalis contra Cancrum Acta, 5:* 85–91, 1940.

MUSCLE—Quantitative Changes in Muscle Protein Fractions during Rat Development. Heinz Herrman and J. S. Nicholas. *Journal of Experimental Zoology, 107:* 165–176, 1948.

Enzymatic Liberation of Inorganic Phosphate from Adenosinetriphosphate in Developing Rat Muscle. Heinz Herrman and J. S. Nicholas. *Journal of Experimental Zoology, 107:* 177–182, 1948.

NADING, M. M.—Recreation for "the oldsters." *Public Welfare in Indiana, 58:* no. 4, 11–13, 1948.

NATIN, ISSAC—Los Límites de Edad para el Neumotórax. *La Prensa Médica Argentina, 35:* 691–694, 1948.

NECHELES, H.—(See Strauss, J. Jr.)

NEUBERGER, MAX—The Latin Poet Maximianus on the Miseries of Old Age. *Bulletin of the History of Medicine, 21:* 113–119, 1947. Abstract, *Psychological Abstracts, 22:* 194, 1948.

NICHOLAS, J. S.—(See Herrman, Heinz.)

NIELSEN, J.—and M. Lindhardt. The Cancer Mortality in Denmark. *Ugeskrift for Laeger, 104:* 468–475, 1942.

NUTRITION—Fatty Acid Deficiency in Mature Rats. Anon. *Nutrition Reviews, 6:* 149–151, 1948.

Nutrition for the Aged. C. M. McCay. *Report of the New York Legislative Committee on Nutrition, 1:* 128–134, 1947.

Nutritional Status of Older Women; Nitrogen, Calcium Phosphorus Retentions of Nine Women. P. H. Roberts, C. H. Kett, and M. A. Ohlson. *Journal of the American Dietetic Association, 24:* 292–299, 1948.

Renal Changes in Rats of Various Ages Deprived of Dietary Choline. W. S. Hartcroft. *Revue Canadienne de Biologie, 7:* 184, 1948.

OBSTETRICS—Elderly Primagravidae. P. C. Dulta. *Journal of Obstetrics and Gynaecology of the British Empire, 55:* 68–70, 1948.

OEHLKERS, F. — Genetisch-physiologische Untersuchungen zum Vitalitäts-problem. *Biologisches Zentralblatt, 67:* 45–52, 1948.

OGILVIE, G. F.—(See Pett, L. B.)

OHLSON, M. A.—(See Roberts, P. H., and C. H. Kett.)

OLBRICH, O.—Blood Changes in the Aged. *Edinburgh Medical Journal, 55:* 100–115, 1948.

OPHTHALMOLOGY—An Experimental Study of Lens Regeneration in Triturus viridescens viridescens. I. Regeneration of a Lens after Lens Extirpation in Embryos and Larvae of Different Ages. Randall W. Reyer. *Journal of Experimental Zoology, 107:* 217–268, 1948.

Some Practical Aspects of Geriatric Ophthalmology. F. L. Philip Koch. *Geriatrics, 3:* 163–165, 1948.

Subjective "Lighting Streaks." R. F. Moore. *British Journal of Ophthalmology, 31:* 46–50, 1947.

On Genesis and Operation of Senile Entropion. A. Kettesy. *British Journal of Ophthalmology, 32:* 311–313, 1948.

OSWALD, K. M.—Helping the Old. *Lancet:* no. 6507, 770, 1948.

PADLEY, R.—Studies on Age and Wastage in Industrial Population; Age and Incidence. R. Padley. *British Journal of Social Medicine, 1:* 13–37, 1947.

PAREDES, V.—(See Bebín, J.)

PASQUALINO, A. — Comportamento dello Stroma della Ghiandola Surrenale nei Vari Periodi della Vita nell'Uomo (Behavior of the Stroma of the Adrenals in the Various Periods of Life in Man). *Archivo italiano di anatomia e di embriologia, 46:* 288–329, 1941.

PENSIONS—Funny Money; Crank's Dreams of Curing World's Economic and Social Ills. Anon. *Fortune, 37:* 136, April, 1948.

Then and Now. A. Taylor. *New York Times Magazine:* 27, May 30, 1948.

PEPTIC ULCER—Successful Closure of a Perforated Peptic Ulcer in a Man 84 Years of Age. C. B. Ripstein. *Canadian Medical Association Journal, 58:* 281, 1948.

PERLMAN, P. J.—(See Leonard, S. L.)

PETT, L. B.—and G. F. Ogilvie. Haemoglobin Levels at Different Ages. *Canadian Medical Association Journal, 58:* 353–355, 1948.

PHYSIOLOGIC GENETICS — Genetisch-physiologische Untersuchungen zum Vitalitätsproblem. F. Oehlkers. *Biologisches Zentralblatt, 67:* 45–52, 1948.

PHYSIOLOGY—Effect of Age of the Human Brain on the Electroencephalogram during Hyperventilation. T. C. Barnes and M. D. Amoroso. Abstract, *Anatomical Record, 99:* 622–623, 1947.

Quelques Caracteristiques Physiologiques de la Senescence chez le Rat (Some Physiological Characteristics of Senescence in the Rat.) François Bourlière. *Revue Canadienne de Biologie, 6:* 245–254, 1947. Abstract, *Physiological Abstracts, 22:* 323, 1948. *Biological Abstracts, 22:* 863, 1948.

Vosrastnoi Fiziologii na VII Vsesoiusnom Sezde Fiziologov; 20–28 VIII. 1947 (Problems of Age Factors in Physiology at the VII Pan-Union Congress of Physiologists, Biochemists, and Pharmacologists, 20–28, VIII, 1947). I. A. Arshavsky. *Pediatria, Moskva:* no. 1, 5–13, 1948.

PSYCHIATRY — Demencia Presenil Hereditaria por Atrofia Cortical (¿Enfermedad de Pick?) (Hereditary Presenile Dementia by Reason of Cortical Atrophy ((Pick's Disease?))). J. Bebín and V. Paredes. *Revista Neuro-Psiquiatria, 10:* 177–188, Abstract, *Psychological Abstracts, 22:* 340, 1948.

Pneumoencephalographic Diagnosis in the Presenile Dementias. Paul Chodoff, Alexander Simon, and Walter Freeman. *American Journal of Roentgenology and Radium Therapy, 59:* 311–317, 1948.

Presenile Dementia (Alzheimer's Disease), Its Pathogenesis and Classification. Karl Stern and George E. Reed. *American Journal of Psychiatry, 102:* 191–197, 1945.

Psychiatric Aspects of Senility. A. Warren Stearns and Albert D. Ellman. *Journal of the Maine Medical Association, 38:* 257–264, 1947. Abstract, *Digest of Neurology and Psychiatry:* series 16, 306, 1948.

Psychiatric Disorders among the Chronic Sick in Hospital. James W. Affleck. *Journal of Mental Science, 44:* 33–45, 1948.

Study of the Plantar Response in Hypnotic Age Regression. Lothar Gidro-Frank and Margaretta Keller Bowersbuch. *Journal of Nervous and Mental Diseases, 107:* 443–458, 1948.

Treatment of Psychoses in Old Age. C. I. Solomon. *Meriden Hospital Bulletin, 2:* 12–15, 1948.

PSYCHOLOGY—Age and Strength. M. Bruce Fisher and James E. Birren. *Journal of Applied Psychology, 31:* 490–497, 1947. Abstract, *Psychological Abstracts, 22:* 245, 1948.

Child Guidance in Old Age. J. M. Mackintosh. *Public Health Nursing, 39:* 538, 1947.

Emotional Problems of Elderly People. Maxwell Gitelson. *Geriatrics, 3:* 135–150, 1948.

Normal Changes in the Mental Abilities of Adults as Age Advances. G. A. Foulds and J. C. Raven. *Journal of Mental Science, 44:* 133–142, 1948.

Note on the Age Placement of Year-scale Tests. Edgar A. Doll. *Journal of Consulting Psychology, 11:* 144–147, 1947.

Psychological Problems of the Aging Personality. A. L. Vischer. *Bulletin der schweizerischen Akademie der Medizinischen Wissenschaft, 2:* 280–286, 1947. Abstract, *Psychological Abstracts, 22:* 194, 1948.

Psychological Understanding in Casework with the Aged. Joan M. Smith. *Journal of Social Casework, 29:* 188–193, 1948.

PUGH, E. J.—(See Haist, R. E.)

QUASTLER, HENRY—and Marianne Baer. Inhibition of Plant Growth by Irradiation. I. Discrete Steps of Growth Inhibition and Pattern of Dose-response-relation. *Journal of Cellular and Comparative Physiology, 31:* 213–234, 1948.

RANDALL, O. A.—The Aging, the Aged. *Public Health Nursing, 40:* 66–71, 1948.

RAUBE, AVERY S.—An Easy Graduation to Retirement. *Conference Board Personnel Management Record, 10:* 297–304, 1948.

RAVEN, J. C.—(See Foulds, G. A.)

RECREATION—Recreation for "the Oldsters." M. M. Nading. *Public Welfare in Indiana, 58:* no. 4, 11–13, 1948.

REECE, R. P.—(See Warbritton, V.)

REED, GEORGE E.—(See Stern, Karl.)

RETIREMENT—An Easy Graduation to Retirement. Avery S. Raube. *Conference Board Personnel Management Record, 10:* 297–304, 1948.

Planning Your Retirement Income. Anon. *Medical Economics, 25:* 89–97, 1948.

REYER, RANDALL W.—An Experimental Study of Lens Regeneration in Triturus viridescens viridescens. I. Regeneration of a Lens after Lens Extirpation in Embryos and Larvae of Different Ages. *Journal of Experimental Zoology, 107:* 217–268, 1948.

REYNOLDS, EARLE L.—Distribution of Tissue Components in the Female Leg from Birth to Maturity. *Anatomical Record, 100:* 621–630, 1948.

RIPSTEIN, C. B.—Successful Closure of a Perforated Peptic Ulcer in a Man 84 Years of Age. *Canadian Medical Association Journal, 58:* 281, 1948.

ROBERTS, P. H.—C. H. Kett, and M. A. Ohlson. Nutritional Status of Older Women; Nitrogen, Calcium Phosphorus Retentions of Nine Women. *Journal of the American Dietetic Association, 24:* 292–299, 1948.

ROLLESTON, C.—Medical Health Services for Elderly Persons. *Medical Officer, 79:* 25, 1948.

ROSENTHAL, G. M.—(See Allee, W. C., Bernard Greenberg, and Peter Frank.)

ROWELL, E. M.—On Growing Old. *Hibbert Journal, 46:* 45–48, Oct., 1947.

RUBIN-RABSON, G.—What's Wrong with Growing Old? *Hygeia, 26:* 278–280+, 1948.

RUNOVA, M. F.—Effect of Bogomolets' Antireticular Cytotoxic Serum upon Experimental Tumors. *Biulleten eksperimental 'noi biologii, 24:* no. 7, 17, 1947.

SAXER, A.—The Swiss Old-age and Survivors' Insurance Scheme. *International Labour Review, 56:* 543–565, 1947.

SCHMITT, H. G.—Diagnose und Behandlung der Senilen Osteoporose und der Osteomalazie. *Klinik und Praxis, 1:* 40–43, 1946.

SCHRIER, CHRISTIAN F.—Causes of Mortality among Employed Persons (1927–1945). *Industrial Medicine, 17:* 47–51, Feb., 1948. Abstract, *Digest of Neurology and Psychiatry, 16:* 219, 1948.

SCOW, ROBERT—(See Becks, Hermann, Miriam E. Simpson, C. Willet Asling, and Herbert M. Evans.)

SELIGER, ROBERT V.—Alcoholism in the Older Age Groups. *Geriatrics, 3:* 166–170, 1948.

SENEVIRATNE, R. D.—(See Cameron, G. R.)

SHELDON, J. H.—Some Aspects of Old Age. *Lancet:* no. 6504, 621–624, 1948.

SHERLOCK, S.—(See Dible, J. H., and J. McMichael.)

SHOCK, N. W.—Metabolism in Old Age. *Bulletin of the New York Academy of Medicine, 24:* 166–178, 1948.

SIMON, A.—Geriatrics. *American Journal of Psychiatry, 104:* 476, 1948.

SIMON, ALEXANDER — (See Chodoff, Paul, and Walter Freeman.)

SIMPSON, MIRIAM E.—(See Becks, Hermann, C. Willet Asling, Daniel A. Collins, and Herbert M. Evans.)

SIMPSON, MIRIAM E.—(See Becks, Hermann, Robert Scow, C. Willet Asling, and Herbert M. Evans.)

SKIN—Variations in Dermal Absorption with Age. J. Strauss, Jr., and H. Necheles. *Journal of Laboratory and Clinical Medicine, 33:* 612–617, 1948.

SMITH, JOAN M.—Psychological Understanding in Casework with the Aged. *Journal of Social Casework, 29:* 188–193, 1948.

SOCIAL SECURITY—Inflation vs. Social Security; Old-age Insurance. Anon. *U.S. News, 24:* 40–43, May, 28, 1948.

Insurance Your Insurance. Irving Ladimer. *Personnel Administration, Washington, 10:* 23–29, 1948.

Swiss Old-age and Survivors' Insurance Scheme. A. Saxer. *International Labour Review, 56:* 543–565, 1947.

Swiss Compulsory Old-age and Survivors' Insurance Scheme. Anon. *International Labour Review, 56:* 190–192, 1947.

SOLOMON, C. I.—Treatment of Psychoses in Old Age. *Meriden Hospital Bulletin, 2:* 12–15, April, 1948.

STAINSBY, WENDELL J.—and James A. Collins, Jr. Diabetes Mellitus. An Analysis of 250 Cases and a Discussion of Simplified Procedures for Regulation. *Pennsylvania Medical Journal, 50:* 808–811, 1947.

STEARNS, A. WARREN—and Albert D. Ellman. Psychiatric Aspects of Senility. *Journal of the Maine Medical Association, 38:* 257–264, 1947. Abstract, *Digest of Neurology and Psychiatry:* Series 16, 306, 1948.

STEDMAN, M. M.—(See Borrow, A., L. Fowden, J. C. Waterlow, and R. A. Webb.)

STERN, KARL—James S. Tyhurst, and Brigette A. Askonas. Note on Hippuric Acid Synthesis in Senility. *American Journal of Medical Science, 212:* 302–305, 1946.

STERN, KARL—and George E. Reed. Presenile Dementia (Alzheimer's Disease), Its Pathogenesis and Classification. *American Journal of Psychiatry, 102:* 191–197, 1945.

STIEGLITZ, E. J.—Health in an Aging Population. *Bulletin of the Medical Society of the County of Monroe, 5:* 313–315, 1948.

STODDARD, ALAN—Physical Medicine in the Care of the Aged and Chronic Sick. *British Journal of Physical Medicine, 2:* 10–13, 1948.

STRAUSS, J., JR.—and H. Necheles. Variations in Dermal Absorption with Age. *Journal of Laboratory and Clinical Medicine, 33:* 612–617, 1948.

STURDEE, E. L.—The Social Problems of Old Age. *Nursing Mirror and Midwives Journal, 86:* 349, 1947.

SURGERY—Surgery in the Aged. C. Stuart Welch. *New England Journal of Medicine, 238:* 821–831, 1948.

Surgical and Medical Problems of Old Age. J. B. Duguid. *Nursing Mirror and Midwives Journal, 86:* 385, 1948.

TANKIN, LOUIS H.—(See Abeshouse, Benjamin, and Samuel Lerman.)

TAYLOR, A.—Then and Now. *New York Times Magazine:* 27, May 30, 1948.

TEETH—The Influence of Age in the Development of Dental Caries in the Rat (Rattus norvegicus). G. E. Braunschneider, H. R. Hunt, and C. A. Hoppert. *Journal of Dental Research, 27:* 154–160, 1948.

TUBERCULOSIS—Age Specific Susceptibility to Tuberculosis; Experiments on Guinea Pigs and Rats. C. J. Duca. *American Review of Tuberculosis, 57:* 99, 1948.

Los Límites de Edad para el Neumotórax. Isaac Natin. *La Prensa Médica Argentina, 35:* 691–694, 1948.

TURVILLE, C. S.—and R. D. Dripps. The Anesthetic Management of the Aged. *Pennsylvania Medical Journal, 51:* 434–436, 1948. Abstract, *International Surgical Digest, 45:* 220–222, 1948.

TYHURST, JAMES S.—(See Stern, Karl, and Brigette A. Askonas.)

URINARY TRACT DISEASE—Incontinence of Urine in the Elderly. Anon. *British Medical Journal:* no. 4555, 817–818, 1948.

Nocturnal Frequency in Elderly Men. Anon. *British Medical Journal:* no. 4552, 672, 1948.

VISCHER, A. L.—Psychological Problems of the Aging Personality. *Bulletin der schweizerischen Akademie der Medizinischen Wissenschaft, 2:* 280–286, 1947. Abstract, *Psychological Abstracts, 22:* 194, 1948.

VISSCHER, M. B.—(See Chentze, Hsiang Wu.)

VITAMINS—Influence of Vitamin A Deficiency on the Gross Efficiency of Growth of Rats. Jean Mayer. *Yale Journal of Biology and Medicine, 20:* 403–405, 1948.

WARBRITTON, V.—and R. P. Reece. Mammary Glands of the Rat during Growth and Senescence. *Experimental Medicine and Surgery, 5:* 33–48, 1947.

WATERLOW, J. C.—(See Borrow, A., L. Fowden, M. M. Stedman, and R. A. Webb.)

WEBB, R. A.—(See Borrow, A., L. Fowden, M. M. Stedman, and J. C. Waterlow.)

WELCH, C. STUART—Surgery in the Aged. *New England Journal of Medicine, 238:* 821–831, 1948.

WOOD, J. M.—Unwanted Women; Emptiness in Lives of Many Women Forty and Over. *Womans Home Companion, 75:* 38+, May, 1948.

YEAKEL, ELEANOR H.—and Edmond J. Farris. Changes with Age in the Weight of the Liver in Wistar Albino Rats. Abstract, *Anatomical Record, 97:* 377–378, 1947.

YOUNG, M. WHARTON—Anatomical Factors in Senile Alopecia; Experimental Production of Baldness. Abstract, *Anatomical Record, 97:* 378–379, 1947.

YOUMANS, A. S.—The Relationship of the Age of the Bacterial Culture to the Delay in Sulfonamide Bacteriostasis. *Journal of Bacteriology, 55:* 503–515, 1948.